



FRIDAY, SEPT. 15, 1893.

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## Contributions.

## Material for Couplers.

CHICAGO, Sept. 4, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:  
In your issue of Sept. 1 I note that "Steel Coupler" has taken up the cudgels again on behalf of his namesake, and makes another attack on the conclusions you deduced from the results of the late trials. Therefore, please publish the following record:

RESULTS OF COUPLER TESTS MADE BY THE WESTERN RAILWAY CLUB.

Make.	Material.	Results.
A.	Steel.	1st, O. K. after fifth blow. 2d, O. K. after fifth blow.
B.	"	1st, broke first blow at 15 ft. 2d, broke third blow at 10 ft.
D.	"	would not unlock after first blow.
E.	"	1st, O. K. after fifth blow. 2d, would not unlock after second blow. 3d, special heat. 4th, special heat. Lock bar bent second blow.
F.	"	1st, pivot pin bent fifth blow. 2d, would not unlock after first blow.
J.	"	1st, would not open after third blow. 2d, would not open before fifth blow, opened after fifth blow.
L.	"	would not open after second blow.
M.	"	1st, broke 1st blow at 15 ft. 2d, broke 1st blow at 15 ft.
O.	"	1st, broke 2d blow at 15 ft. 2d, would not unlock after second blow.
Q.	"	1st, would not unlock after second blow. 2d, would not unlock after second blow.
C.	Malleable Iron.	1st, O. K. after fifth blow. 2d, O. K. after fifth blow.
G.	"	1st, O. K. after fifth blow.
H.	"	2d, would not unlock after third blow. 1st, would not open after third blow, pin bent.
I.	"	2d, O. K. after fifth blow. would not unlock after second blow.
K.	"	1st, broke third blow at 10 ft. 2d, broke third blow at 10 ft.
N.	"	1st, broke third blow at 10 ft. 2d, broke first blow at 15 ft.

Steel Couplers.—Ten makes, twenty couplers (including two special). The eighteen steel couplers made the following showing:

3	were in working order after the regulation test.
3	were broken or disabled second blow at 15 ft.
3	" " " first " 15 ft.
2	" " " third " 10 ft.
5	" " " second " " "
2	" " " first " 10 ft.

18

Malleable Couplers.—Seven makes, twelve couplers. The twelve malleable couplers made the following showing:

4	were in working order after the regulation test.
1	was broken or disabled second blow at 15 ft.
1	" " " first " "
4	" " " third " "
2	" " " second " 10 ft.

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Three out of eighteen steel couplers were in working order after being tested up to the M. C. B. requirements; four out of twelve of the malleable couplers were in working order after undergoing the same test.

## MALLEABLE.

## The Essentials of a Coupler Test.

NEW YORK, Sept. 8, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your reply to "Steel Coupler" seems to me in many respects so apt that I can scarcely refrain from adding my mite to the very interesting discussion that coupler tests have brought out. The fact that the malleable bar showed up so well in comparison to the steel bar is, undoubtedly, a surprise and a sort of chagrin to many makers of steel castings. The facts, however, seem to be that, while the malleable bar was not as good as the best steel bar, it was much better than the poorer ones.

The point that you make about the extra cost of the steel bar is, undoubtedly, well taken, and it does seem absurd to pay extra for steel if the malleable bar is good enough. Within the last few days, however, I have seen two carloads of broken couplers. These passed me on the railroad and I did not have time to investigate them, but I came to the conclusion that some roads needed better drawbars.

It is somewhat doubtful in my mind whether the tests, as made, are of any great practical value. To test different drawbars for strength of design, it seems necessary to make them of the same heat of iron or steel and anneal them in the same furnace at the same time. It may well happen that a drawbar of a very superior design was made of inferior material, in which case it might not give as good results as a poorer design made of better material. On the other hand, to test different materials it would seem desirable to make the same coupler of all the materials to be tested, for undoubtedly some bars failed, not because the material was bad, but because the design was bad.

In other words, there are two questions to be settled in these tests, and each will require a separate set of tests. It may not be possible to make the tests as suggested, and indeed it may not be necessary, as the number of really good couplers is limited, and the question to be decided, Is malleable iron good enough or do we need the best steel? There will undoubtedly be a great difference of opinion about this, and I am not sure that the conditions in the tests are sufficiently near those obtained in actual practice to allow us to decide positively. Is it not possible that of two couplers, one might stand a few severe shocks best, while the other might greatly outlast it when subjected to a great many shocks of less severity, such as obtained in practice?

H. L. GANTT.

## Uniformity and Simplicity in Night Signals.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I understand from a reliable source that it is the intention of a certain railroad company to call a conference of its chief transportation officers in the near future with reference to the adoption of standard fixed night signals. This company at present uses three distinct systems, viz.: 1. the single lamp; 2. the three-lamp; 3. the illuminated blade.

Several years ago I had occasion to repeatedly attack the illuminated blade, both in the columns of the *Railroad Gazette* and in other ways; but as most people conversant with the matter have through recently gained practical experience discarded the device, I shall not recur to the matter. This question of night signals, while of the first importance, has been sadly neglected by our railroads. Inventors with practically no knowledge of signaling have been allowed to foist their unique ideas on some roads, while the outspoken views of experienced men have been unheeded.

The acme of excellence in signals is afforded by that system which combines, in maximum, distinctiveness and simplicity. For this reason men of experience will stand by the single strong red light for danger, and a strong white or green light for "All clear." The principal defect with our present night signals is simply that the construction of the lantern is primitive and inefficient. Its average effect is not good, for while it is possible to trim and adjust these lamps, so as to give a fairly strong light for a short time, I have found that it is impossible to maintain a good average efficiency.

As several times pointed out in your paper, we stand in this respect far behind the European practice. I am in a position to know that the signal lamp makers will be only too pleased to manufacture improved lamps.

ARTHUR H. JOHNSON.

## One More Association Called For.

NEW YORK, Aug. 28, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your comments on page 640 of your last issue, on destination boards for passenger trains, you say: "It is regrettable that no two station masters have ever had the same ideas, so that a passenger has to adjust himself to some differences of treatment of this matter at every large station he enters." Station masters as a rule travel but little. They have no annual meetings as do the superintendents and roadmasters, at which such questions can be discussed and standards adopted; and so while as a rule they all wish to be wide awake and progressive and manage their properties about right yet naturally they develop and progress along diverging instead of parallel lines, and here and there you will see good points of management and operation apparently unknown to all of the others.

This is an age of technical associations, especially of those pertaining to railroad operations; why would not an organization of station masters and managers of our large terminal stations be an eminently proper one? Its meetings would be held in the large cities at a different place each year, and the practical education derived by actual inspection of existing stations and terminals would soon bear fruit.

I am personally acquainted with some of these officers and know of instances where for years the operating officer has never left his post and knows but little of how his brother officer in an adjoining city handles his property and traffic.

EDWIN A. HILL.

[The Superintendents' Society or the American Railroad way Association ought to be able to sufficiently discuss

the placard question and to decide upon the best practice; but we agree with Mr. Hill that the station masters do not travel enough, and so we will not say a word against his proposal. If an association will aid the station masters in getting leaves of absence let them have an association. Everybody else has an association, even the car oilers, and we presume the tie-tamers; no use in being left out of the list.—EDITOR RAILROAD GAZETTE.]

## Heads or Tails?

SEPT. 1, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your correspondent who discussed recently the question of the proper position of a railroad sleeper, that is to say, one of the kind that is over instead of under the wheels, hit the nail on the head when he spoke of the traveler of the present day as being a crank. The object of a crank is to create a revolution. When sleeping cars were first introduced, and the crank started, he lay feet first. Now he has made half a revolution, and is apparently head-first; but in the course of a short time he will get back to his starting point, and will be found to lie in the normal position of a man traveling in a horizontal direction.

The variety of customs among the passengers on the excursion which your correspondent mentions only shows that there were cranks at different stages of revolution, some were head first, some were feet first and some no doubt preferred to remain upright, and did not go into a sleeping car at all. This has been the case with a number of passengers I have met during the past summer; I have not met any, however, who preferred the posture which your correspondent mentions as the most delightful to a diving lad, and which he thinks would be the most comfortable in an elevator. As for the delight of diving, I doubt whether it proceeds from the fact that the sensation is more comfortable than descending feet foremost; it is simply due to the desire to take some mode of exercise which is abnormal and unnatural. It is like bicycling, in which the majority of laborers, at least as I see them on a Sunday morning at the top of a country hill, put themselves into a U shape, which they had never thought of doing until they got on a wheel, and contracted *kymosis*.

I, too, have been very much struck during the last summer with the change of position in the sleeper. In a pretty extensive set of tours, ranging from Deseret to Mt. Desert within the last six months, I have found that the porters all made up the beds with the head to the engine, unless specially requested to the contrary. For my own part, I still prefer to go feet foremost, but I have found, from frequently taking trains at way stations in the middle of the night, when nothing but an upper berth was to be had, and that was made up with its head the wrong way, that really it makes very little difference which way you lie and that local circumstances must govern your action in order to be comfortable.

One night, in going to Boston in the somewhat antiquated contrivances in use on the main route between that city and New York, it was necessary to get my head into the farthest forward corner of the berth to avoid the draft from the adjacent door and the open window of the section opposite, which was not made up, and was used as a conversation room by the porters and conductors. In returning the following night I was much more comfortable, owing to the direction of the drafts and the proximity of a brightly burning lamp, with my head toward the rear of the train. Whether this proves that one should always travel with his feet to the West, or that it is proper to put your brains in the direction of Boston, I do not know; I simply state the facts as they occurred.

The conclusion of the whole matter seems to me to be that every man must do as is most comfortable to him. Mr. Plyman appears to be troubled with cold feet and a hot head, as he covers up the former and is afraid of the sudden cooling of the latter by contact with cold air. On the other hand, I find the greatest comfort in a sleeping car to be attained by covering my head with a small cap, which keeps off the drafts, and uncovering my feet.

Just one word with regard to rapid elevators, to which allusion has been made. Before one gets accustomed to them, the best way to avoid the unpleasant sinking sensation before alluded to is rising on your toes just as the elevator begins to drop.

BEN TROVATO.

## High Train Speeds in England.

TO THE EDITOR OF THE RAILROAD GAZETTE:

LONDON, Aug. 12, 1893.

I have lately had occasion to examine into the possibilities and prospects of greater speeds upon our steam railroads, and of course the unusually good results achieved in this direction by the N. Y. C. & H. R. express could not fail to be of material importance in endeavoring to reach some definite conclusion. To discuss or criticize the latest records is not my object, however, at this time; most English engineers are perfectly ready to believe that No. 999 eclipsed all previous best speeds, because such a result is only what may be obtained by any road under proper conditions. The credit due to the New York Central is principally for having made use of the conditions of line, power, loads, etc., under which alone these high speeds may be attained with safety.

In your comments upon the 20-hour Chicago flyer, as published in the *Railroad Gazette* of June 2, [I think,

however, that you do not mete out strict justice to the English records of five years ago, when the rival routes to Scotland took to racing over the 400 miles or so between London and Edinburgh. Let me be understood, however, as being in no way desirous of comparing the two series of performances—English of 1888, American of 1893. To my mind the results achieved between New York and Chicago bring out very forcibly the progress made these past few years in locomotive powers, notably so when considering the lengthy runs at high speed.

To work the same locomotive—as was done with No. 999—over a journey of more than 400 miles at a speed exceeding 50 miles an hour, including stops, speaks even more highly for its endurance than for its capacity for reaching a very high speed over any portion of the road. It will be remembered that during the race of 1888 on the West Coast route to Scotland, a relay of three separate engines had to be employed between London and Edinburgh, these being usually a single driver between Euston and Crewe, and from Crewe to Carlisle a four-wheel coupled (both L. & N.W.R. engines), while from Carlisle to Edinburgh a Caledonian single driver worked the trains. English railway men at that time, even as now, found it difficult to run one engine clear through a long journey, because double shifts are as a rule unknown. It is indeed only within the past few months that the L. & N.W.R. have shown what an amount of work may be, and ought to be, got out of a locomotive by keeping it at work for 20 hours or so out of the 24; the "Greater Britain," Mr. Webb's well known compound, having been purposely run on the heavy express traffic in this way, practically to show how great a mileage can be made for a given expenditure of coal and wages. However, this is by the way; I want more especially to correct some of the figures given in your leading article above mentioned.

"The Scotch trains," you say, "reached in 1888 a maximum of 52.7 miles an hour, including stops, for a distance of 392.5 miles; this was but for one run, however, and then the rate dropped down to 50.67 miles for the East Coast route."

I send you herewith a tabular statement compiled from the actual times of departure and arrival of down trains on the West Coast route during the 23 days—Aug. 6 to 31, both inclusive—that the racing was on. You will see from this that the distance, 400 miles, is slightly greater than that mentioned in your article. The East Coast route is 392½ miles long, but I regret that at the moment of writing I cannot lay my hands on the exact details necessary to compile a statement for this route similar to that now given.

WEST COAST ROUTE TO SCOTLAND, AUG. 6-31, 1888.

Twenty-three running days.

Sections.	Distance in miles.	Average running time.	Speed in miles per hour.	Average time over whole distance, in including stops.	Speed, miles per hour, in including stops.
Euston to Crewe...	158	H. M. 52 56	53	6 hours	49.875
Crewe to Preston...	51½	54	57		
Preston to Carlisle	90	1 42*	53		
Carlisle to Edinbro'	299½	1 48	56	1 48	56
Totals & averages	400	7 20	54.5	7 48	52.9

\* Train an hour late on one occasion, owing to breakdown.

† Includes 20-minute stop at Preston.

The running speed (average for the month) in miles per hour, viz., 54.5, was identical on both routes, and you will notice that the average speed on the West Coast route, inclusive of stops (20 minutes for dinner at Preston and an average of 4 minutes each at Crewe and Carlisle) was only reduced to 52.9 miles for the whole time that the trains ran, not merely for one run, as stated in your article. The average running time between Preston and Carlisle was considerably increased by the fact that on one occasion the engine broke down when running up the heavy grade of 1 in 75 at Shap; the quickest run over this section was done in 89 minutes, or 13 minutes less than the average.

The weight of train as given by you is approximately correct, the average load being 4 eight-wheeled carriages of 19½ tons (English) each, on the West Coast route; on the East Coast line the loads were heavier, averaging (without engine and tender) 200,000 lbs., but even then, of course, much less than that of the Chicago flyer. For this reason, and because of the long run with one locomotive, the Chicago service, with its 904 miles in 20 hours—an average of 48.2 miles per hour—deserves an even more prominent place in high-speed records than the 52.9 miles per hour of the English line over half the distance. It is doubtful when the English railway companies will repeat this fast long-distance running, certainly not this year so far as the Scotch traffic is concerned. The excuse is that a service of this kind is not really wanted, and therefore would not pay. Yet the companies are in a better position than ever to make high speeds. Engines of much more powerful type are now employed, and fresh records might be made, say, on the East Coast route, by working the new Scotch cars to York without a stop, and thence straight through to Edinburgh by Mr. Worsdell's new coupled compounds, probably the most powerful locomotives in the country.

F. B. LEA.

#### The Prevention of Strikes.

NEW YORK, July 31, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with much interest, in your paper of July 14, the report of an address of Mr. E. W. Meddaugh, of the Chicago & Grand Trunk Railroad, in which are discussed the possible or probable remedies for the loss and distress frequently suffered by railroad employees and the public in consequence of strikes of railroad men. I think you have made about the right estimate of Mr. Meddaugh's proposition when you say, in substance, that his suggestions are in the right line, that the progress of education necessary to the reforms will be slow. His scheme for contracts with employees, either individually or as labor organizations, will be all right—when it is put in effect; but his theory that railroad commerce can be policed as readily as commerce by water is yet to be tested. I fear it will not amount to much in practice.

We must bear in mind that a company of sailors who threaten to delay a ship can be subdued by the captain's pistol; but pistols will not answer in a Chicago freight yard. It is physically impossible to deal with our difficulties with freight cars, engines and switches as we would deal with ships; and in addition to this, the intervention of policemen brings in other complications. The American citizen, whether you call him "workingman" or "sovereign," has a good deal to say about his traditional "liberty" on such occasions as strikes; and policemen, and country magistrates as well, are often inclined, to give a good deal of weight to the sentiment manifested by the party which they call the underdog in the fight. Again, pistols work very well for dealing with small bodies of men, under circumstances where they would be utterly useless in dealing with 500 or 1,000 individuals. The moral effect is a large part of the power of a pistol in the hands of a defender of the law, but when the great majority of society (in the immediate vicinity) is on the side at which the pistols should be aimed the fundamental rule that the majority must govern at once comes in to bother us.

This majority rule, indeed, is what makes all the trouble in dealing with this problem. The only insurmountable difficulty with Mr. Meddaugh's scheme for getting railroad employees to organize themselves into corporations, with which a railroad corporation can make a contract, is that the majority of the people, as represented in the legislatures, will not consent to it. Our legislatures are ready enough to authorize the formation of corporations with loose by-laws which will give free rein to the inexperienced adventurers whom "workingmen," including railroad employees, take delight in placing at the head of their affairs, but when it comes to establishing a responsible body, which will amount to something in a business way, we always find that some demagogue makes objection, and the objection prevails. "There is no law against a man making a fool of himself," and it sometimes seems as though this precious guaranty were the most cherished possession of our labor unions. The only way to think any better of the rank and file is to assume that their representatives do not truly represent them. Our governors, railroad commissions and courts could and would devise practicable schemes for preventing strikes, while at the same time preserving the rights of labor, but the majority—the voters—come in to prevent any such happy result. In England, as we see by Mr. Seargent's paper, printed by you in the same issue above referred to, capital takes measures to help the laboring man and at the same time enhance his feeling of friendship—call it "loyalty" if you please—but in this country strong jealousy is aroused at the mention of such things.

It seems to me that the history of labor troubles on railroads in this country for the past few years teaches us to place little dependence, for the present at least, on the schemes presented by Mr. Meddaugh, but to plod along in the beaten track, to fight every strike with increasing pluck and persistency, and to let uneasy employees learn the lessons of life by hard experience, as the rest of us do.

A. G. R.

#### A Long Run with a Broken Smokestack.

The illustrations show a broken cast iron smokestack with which an engineer and fireman took a five-car train, two cars being sleepers, a distance of 105 miles in three hours and 15 minutes, or at an average of 32½ miles an hour. There was one grade 25 miles long with sharp curvature, the incline varying from 20 ft. to 76 ft. per mile. The drawing shows the design of the original stack. This is an illustration of what an engineer can do when he makes up his mind to do the best he can under adverse circumstances. Most engineers would have thought it impossible to make this run and would not have taken the train out. The engineer was W. F. Dayton and the train was 103—the Pittsburgh & Cincinnati limited on the Baltimore & Ohio. The run was between Benwood, W. Va., and Newark, O. The stack was knocked off at a coal chute at Benwood. It is evident that the draft apparatus on the Baltimore & Ohio must be in very good shape or this run could not have been made. In some

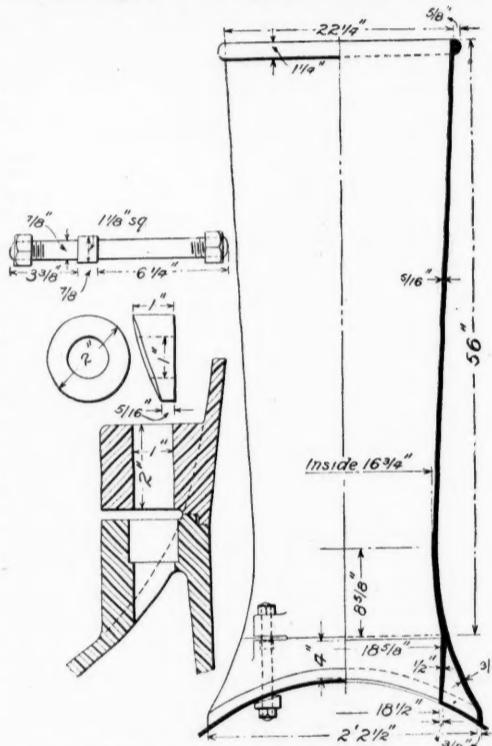
engines there would have been no draft of any moment with this amount of stack removed.

It has frequently been remarked in discussing tests of locomotives, especially compounds, that the engineer and firemen have much to do with the performance of an engine and that a good fireman and a good engineer can make a good showing with a bad engine. This case of pulling through on a hundred-mile run with the fragment of smokestack is a pretty good illustration of what an engineer can do if it is his wish to do it or if he has something to gain by it. The fuel records of different engineers and firemen, under apparently equal conditions, frequently differ 25 to 35 per cent. Perhaps some of this difference is due to the difference of dexterity and knowledge of locomotive running, but in a majority of cases the varying results arise from a difference of desire on the part of the engine runners to make a good showing. The Master Mechanics' Association Committee on Exhaust Pipes and Passages might profitably consider the question why there should be so much difficulty in making steam and in getting a proper draft on some locomotives in view of a case like this. The smokestack is no unimportant piece of the draft apparatus, and the relation between the diameter of the stack and its length to the distance between the exhaust nozzle and the smokestack base often seems to be very imperfectly understood.

The drawing printed below shows the details of construction of the stack that was broken. This style of stack is used on class A and class B engines.

#### Some Smokebox Arrangements for Locomotives.

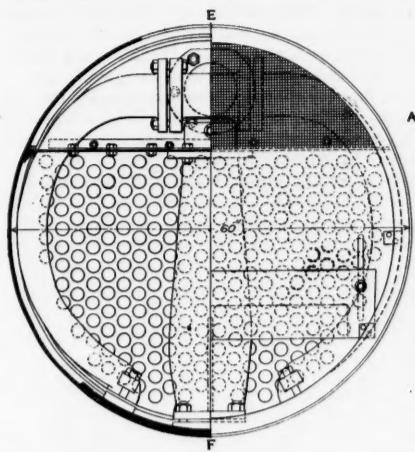
With this we illustrate three different arrangements of extension front ends, two of which are in use on two large railroad systems; the third, which is in use on several roads, was designed by Mr. J. Snowden Bell, who has designed several spark arresters for use on



Cast Iron Smoke Stack—Baltimore & Ohio Railroad.

locomotives. Fig. 1 shows the front end arrangement of the Schenectady consolidation engines on the East Tennessee, Virginia & Georgia. The plate that extends horizontally from the tube sheet to the blast pipe is perforated with holes  $\frac{1}{8}$  in. in diameter and spaced  $3 \times 3$  in. In front of the blast pipe and extending horizontally to the inside face of the front ring is a course of wire netting. At the front end it is extended vertically to the top of the smokebox. There is a manhole 16 in. square in the wire netting. The deflector plate is in front of the blast pipe, the upper end being 32 in. and the lower end 36 in. from the tube sheet and extending horizontally to within about 10 in. of the bottom of the smokebox. At the lower end is a plate that is adjustable in height within a range of several inches.

The diameter of the exhaust tip shown is  $5\frac{1}{4}$  in., but there are some consolidation engines running on this road with exhaust tips 6 in. in diameter. The bridge in the exhaust pipe extends 15 in. from the base, the total length of pipe and tip being  $44\frac{1}{4}$  in. This, it is claimed, gives a large chamber for exhaust steam, and that if the partition extended to nearer the top of the pipe a much larger nozzle could be used, but the effect would be to contract the opening at the top of the partition, making it less in area than the nozzle opening, and so produce an undesirable sharper exhaust. It is further claimed that exhaust pipes with high partitions account for the large tips some roads use, and that, while contracting the pipe at the top of the partition gives a sharp blast, it is done at the expense of the soft exhaust obtained with the blast pipe used on the East Tennessee, Virginia & Georgia. This road is using



single nozzles entirely, and compound engines are steaming freely with single nozzles  $5\frac{1}{4}$  in. in diameter.

The front end arrangement, shown in fig. 2, is a modified form, as used on some engines built by the Rogers Locomotive Works for the Delaware, Lackawanna & Western Railroad, of the design used on some Union Pacific engines built by the same firm. The arrangement as used on the Delaware, Lackawanna & Western engines will be clearly understood from the drawing. This differs from the Union Pacific design only in having the horizontal course made of perforated instead of solid plate. In the Union Pacific arrangement the course extending from the tube sheet to the horizontal course, and also the horizontal course, were of solid plate. The Delaware, Lackawanna & Western found that for anthracite coal it was better to have the

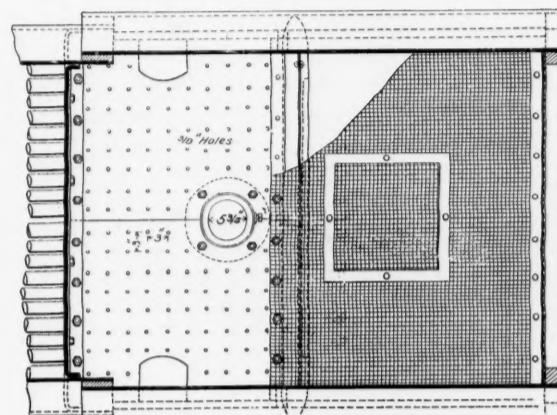
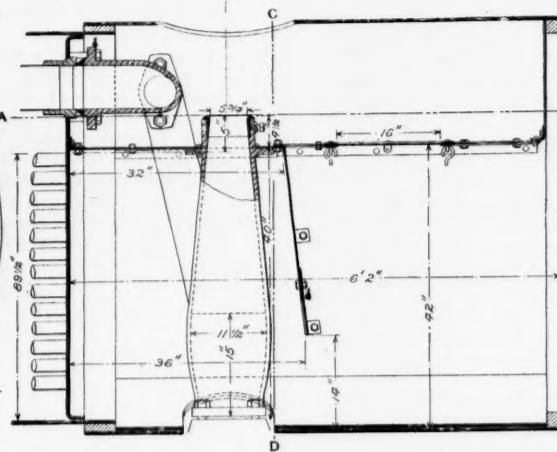


Fig. 1—Smokebox on Schenectady Locomotives—East Tennessee, Virginia & Georgia.

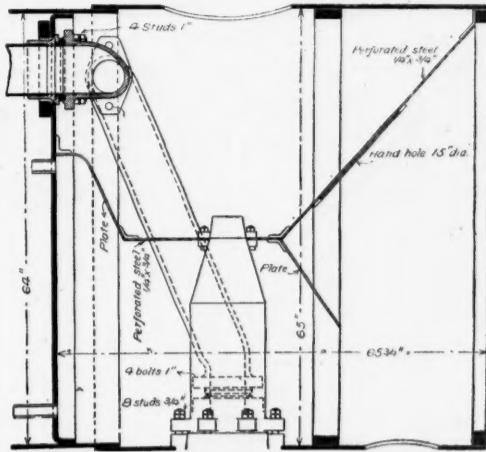


Fig. 2—Smokebox on a Rogers Locomotive—Delaware, Lackawanna & Western.

at the brushes. The next largest dynamo in this plant is one of 750 kilowatts directly connected with a Williams vertical engine of a radial capacity of 1,000 H. P. This engine has, however, furnished the power for the operation of the road without difficulty, the power required with 12 trains on the road averaging from 1,000 to 1,200, with a maximum of 1,500 to 1,600 H. P.

Besides these two machines there are three others in this station, two of 500 and one of 200 kilowatts. One of the larger machines is driven by a tandem compound Reynolds-Corliss engine, and is direct connected, the other by a tandem compound Greene engine, from which the power is transmitted by belting. This plant, while of great interest by reason of its diversified types of dynamos and engines, is perhaps less practical than that of the Westinghouse company in Machinery Hall. Of the twelve 750-kilowatt alternating current dynamos in this plant six are driven by vertical compound-condensing engines, with the low-pressure above the high-pressure cylinder, the crank and connecting rod running in oil as in the single acting Westinghouse engine, and making 200 revolutions a minute. These require about the same floor space as the Williams engine and General Electric dynamo of equal capacity in the Intramural power plant, four of them being located together on a space of 42 x 97 ft. The other Westinghouse generators, with the exception of those used as exciters, which are directly connected to the Westinghouse compound engines, are driven by horizontal compound engines of various sizes and types.

The General Electric Company has also in Machinery Hall a vertical triple expansion engine rated at 1,000 H. P., and driving a 400-kilowatt dynamo at each end of its shaft, the armatures acting as flywheels and overhanging the bearings. A 1,000-H. P. triple-expansion engine built by F. Shchan, of Elbing, Prussia, and driving a 700-kilowatt generator, is also attracting considerable attention. The dynamo exhibit is very complete and engineers may not expect to see further marked improvements in large direct connected generators for some time to come. These exhibits enable the visiting engineer to learn what has been done up to date in the way of direct connected dynamos and to become acquainted with the possibilities of generating heavy currents in a small space with practical and durable machinery.

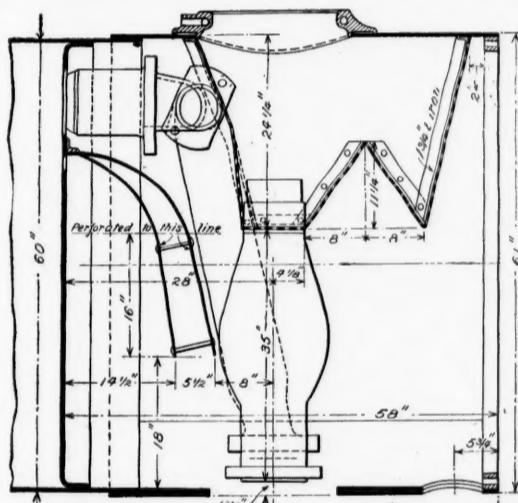


Fig. 3—Smokebox designed by J. Snowden Bell.

horizontal course either of netting or perforated plate. The perforated plate is used in the horizontal course and also in the course extending forward and upward to the top of the smokebox, because the plate is not so quickly destroyed by the heat as is the wire netting. The blast pipe shown with this arrangement has double tips  $3\frac{1}{2}$  in. in diameter, and no convey or draft pipe is used. Engines with this front end arrangement are reported as steaming very freely.

An arrangement for locomotive front ends recently designed by Mr. J. Snowden Bell is shown in fig. 3. This arrangement has been placed on locomotives recently built for the Chicago & Calumet Terminal Railway by the Brooks Locomotive Works; the locomotives were illustrated in the *Railroad Gazette* June 23, 1893. Referring to the drawings, the dimensions on which show the attachment for a boiler 60 in. in diameter, the deflector plate is double and extends in a long bend from the tube sheet, just above the top row of tubes, to within 18 in. of the bottom of the smokebox. The lower end is  $1\frac{1}{4}$  in. from the tube sheet. Both sheets of the deflector have perforations  $\frac{3}{8}$  in. in diameter, pitched 1 in., extending from the lower ends of the plates to a height of 16 in. Any sparks that may pass through these two plates are pretty thoroughly broken in the passage, and when finally emitted from the stack can do little damage in setting fires. The wire netting is put in such a way that only a narrow course, as wide as the diameter of the blast pipe, is horizontal, much the greater part of the netting being placed at an angle to the currents of air passing up to the stack, so that the cinders, that are raised by the exhaust, strike the netting at an angle and are well broken before passing through. Also, the net-

ting is put in such a way that more of it is used than is ordinarily the case, and a greater open area is obtained for the freer passage of the gases to the stack. The netting used is of No. 13 wire 2 by 2 mesh. This device permits of a shorter smokebox than that used with other arrangements, the one with the Bell arrangement being 58 in. long, while the other two shown are respectively 74 in. and  $63\frac{1}{4}$  in. long. With the shorter front, considerable weight is removed from the truck, where it is undesirable, and also the cost of the shorter smokebox must be less than the cost of the longer ones.

#### Heavy Electrical Machinery.

It is not generally known that at the World's Fair there are now to be seen the largest dynamos in the United States, one of which is also the largest direct current dynamo in the world. This is the 1,500 kilowatt machine built by the General Electric Company, and it is now in use in the power-house of the Intramural Railway at the southeast corner of the grounds. This dynamo is direct connected and driven by a compound condensing Reynolds-Corliss engine of 2,000 H. P., running at a speed of 80 revolutions a minute. The armature of the dynamo and the flywheel of the engine are hung close together on the shaft, which is of steel, 23 ft. in length and weighing 56 tons. The shaft is supported at each end by bearings 22 in. in diameter and 42 in. long. The flywheel weighs 85 tons. The armature, which is 8 ft. 1 in. in diameter and requiring in its construction 24 tons of sheet iron and 3 tons of copper, was built up and wound after the placing of the shaft in position. The voltage of this and the other dynamos in this plant is about 550



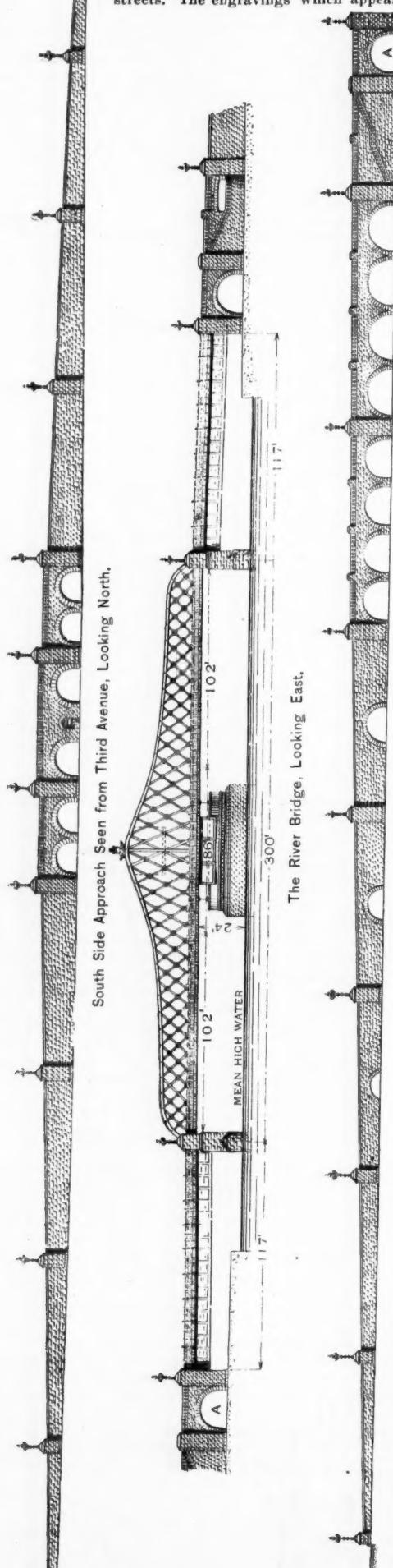
#### Snow's Patent Bell Ringer.

Herewith is an illustration of the Snow bell ringer used on the Delaware, Lackawanna & Western, which possesses all the features essential to good service as described in the *Railroad Gazette* of July 21, 1893, p. 545. This illustration might well have accompanied the three there given and as much said for it. It secures the same essential features only by different connections and shapes of parts. The connections between the piston and bell crank are simple and give all the necessary freedom to the driving rod, while allowing for the swing of the bell. The adjustment of the valve is such that the expansive power of the air or steam is utilized and the piston cushioned on its return stroke. The ringer is adjusted to a bracket from the bell supports, and the whole machine takes up a very small space. It is provided with a lubricator and has given excellent service for several years. These machines are manufactured at the Scranton shops, under Mr. D. Brown, Master Mechanic.

[SEPT. 15, 1893]

**The Third Avenue Bridge Over the Harlem River.**

The city of New York has recently contracted for the construction of a bridge over the Harlem River, on the line of Third Avenue, between 120th and 135th streets. The engravings which appear in



this issue show the principal characteristics of the bridge, which has been designed by Mr. T. C. Clarke under the general direction of Mr. G. W. Birdsall, Chief Engineer Croton Aqueduct. The bridge proper is a riveted lattice, through drawbridge 300 ft. long and 86 ft. wide, with two deck spans

or riveted plate girders, each 112 ft. long by 86 ft. wide. This structure is approached by arcades of the character shown in plan and elevation in the engravings.

The foundations include the pivot pier, which is an annular wall of masonry supported on an annular caisson of timber filled with concrete. The foundation of the rest piers will be similar to that of the pivot pier and it is anticipated that these will have to be sunk to about 45 feet below mean water. The foundations of the arcades and retaining walls are to be on piles. The river masonry, being the pivot and rest piers, is to be of coursed ashlar backed with concrete. The faced stone above the water will be of granite. The interior of the pivot pier will be faced as specified for the exterior facing below low water; that is, it may be of granite, limestone, or any good granite from the old bridge may be used. As has been said above, the land masonry will be on piles; above the piles will be foundation piers and walls of American rock cement concrete; this will be carried not higher than one foot below grade and on this the stone masonry will be built.

The face of the retaining walls and arcades, and of their buttresses, will be of dark colored gneiss or of granite. The backing of the retaining walls and arches in the north approach may be of concrete or of rubble work where over 3½ ft. thick. The coping will be of cut granite. In the arches the face walls will be of dark gneiss or granite, and backed with hard burned brick between the spring line. The voussoirs will be of granite and the copings of cut granite. The interior walls between the voussoirs will be backed with hard burned brick, faced with pressed white brick. The jack arches will be of brick; the copings of the approaches, copings and balustrades of the arcade walls, buttress caps, the copings of the pivot and rest piers and columns of the arcade, with their caps and bases, will all be of granite.

We have mentioned before in general what the metal superstructure will consist of; the construction is shown in the engravings. The draw span is a riveted lattice of plates and angles, except that the floor is made of buckled plates. The riveted plate girder deck spans have corrugated floors; these are shown respectively in the drawings. All of the metalwork is mild, open-hearth steel. The beams, angles and plates are to have an ultimate strength of from 56,000 to 64,000 lbs., with 25 per cent. elongation in eight inches, and 50 per cent. reduction of area. The rivets are to have an ultimate strength of 56,000 to 60,000 lbs. with the same elongation and reduction; and the floor plates, both corrugated and buckled plates, are to have 54,000 to 62,000 lbs. ultimate strength, 20 per cent. elongation and 45 per cent. reduction of area. The material is to be subjected to drifting tests, a ¾-in. hole being punched and drifted to 1⅓ in. Universal plates may be used up to 36 in.; above that sheared plates will be used, but the upper cord plates of the draw must be shaped to the curve at both edges. All sheared edges are to be planed off ⅛ of an inch, or enough to remove cracks or any signs of distress of the material. Plates and shapes up to ¼ of an inch thick may be punched and reamed and the floor plates need not be reamed, but for material over ¼ of an inch thick the holes must be drilled after assembling.

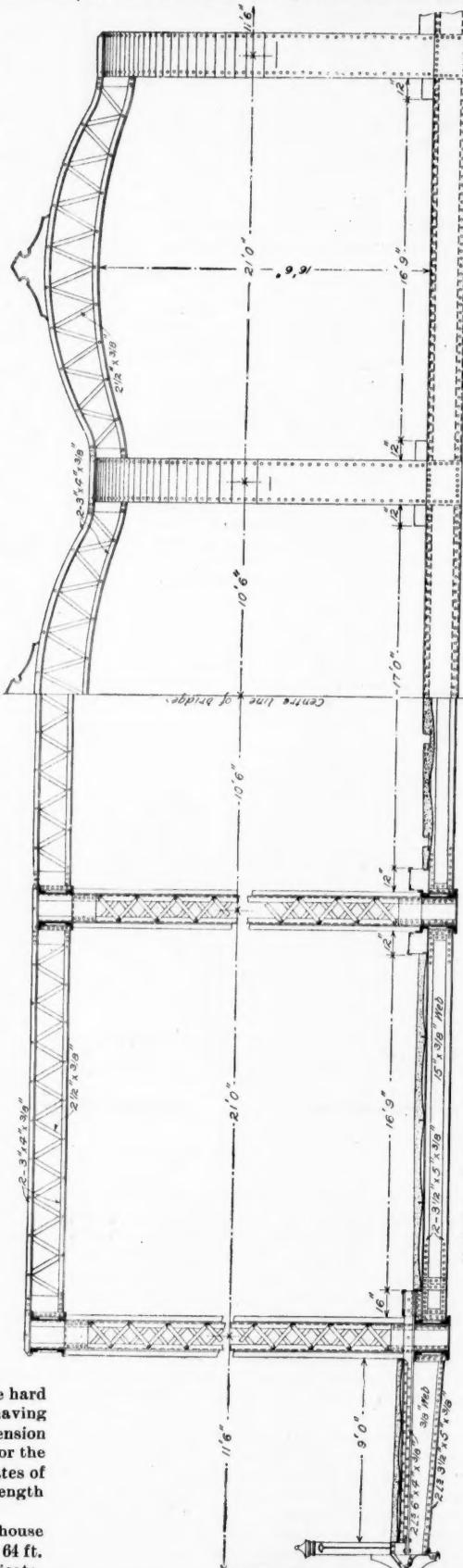
In the turntable the wheel track, wheels, rack and pinion, hub of draw and the rollers and bearing plates of fixed spans are to be of cast steel, open hearth. For the track, wheels and rack and pinion it shall be hard enough to require hardened steel tools to work, having an ultimate strength of 65,000 to 75,000 lbs., an extension of not less than 15 per cent. in 4 in. The steel for the central hub and for bearings, rollers and bed plates of fixed shape shall have 60,000 to 70,000 ultimate strength and an elongation of 15 per cent. in 2 in.

The operating machinery will be in the engine-house above the roadway, which will be 24 ft. wide and 64 ft. long. The engines and boilers will be in duplicate. The steam plant will be two 10 in. by 7 in. double cylinder oscillating engines, each separately coupled to a differential gear machine in proportion of 19 to 1. The engines may be coupled so as to work together or separately. Each end of the draw will have four hydraulic cylinders, one under each track, each of 25 tons capacity at 100,000 lbs. pressure per square inch, for supporting and locking the ends of the draw. These will be 8 in. in diameter by 4 in. through. There will be two 60-H. P. boilers designed for working pressure of 100 lbs. The draw weighs 1,700 tons and is supported on 96 wheels, 12-in. tread and 2 ft. diameter. The hydraulic supports at the ends can be drawn up in a few seconds,

and the whole span, 300×86 ft., can be revolved through one-quarter of a circle in about one and a half minutes.

The bridge will be lighted with incandescent lights from a dynamo and engine on the draw span.

It will be observed that the bridge is designed for two street railroad tracks, to be carried between the two inner trusses, two roadways between the inner and outer trusses, and sidewalks on overhung brackets. The roadways of the draw span will be paved with asphalt on the buckle plate floors; the deck spans will be paved with granite blocks on the corrugated floors, and the sidewalks will be paved with blue-stone flags.



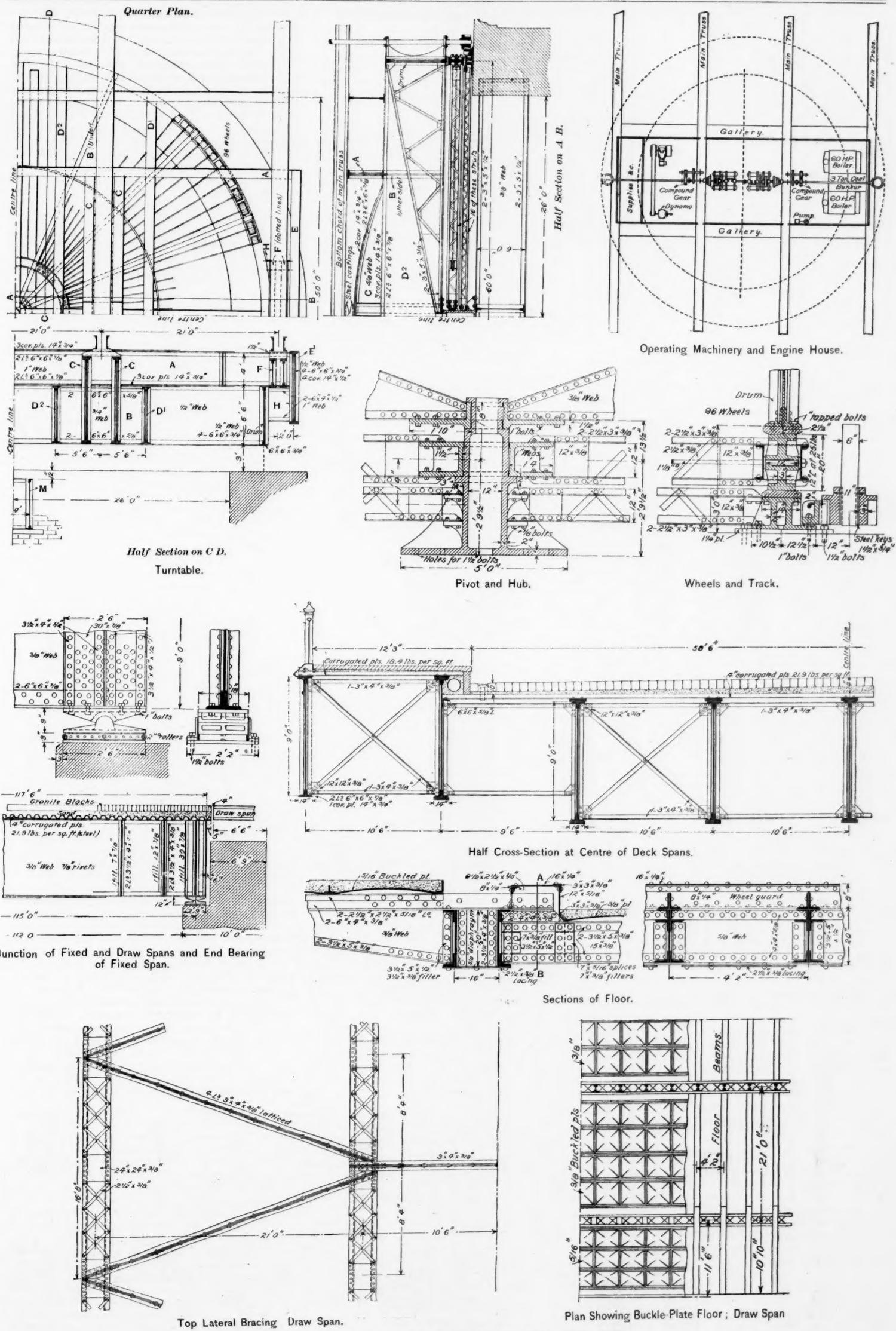
Half End View; Draw Span.

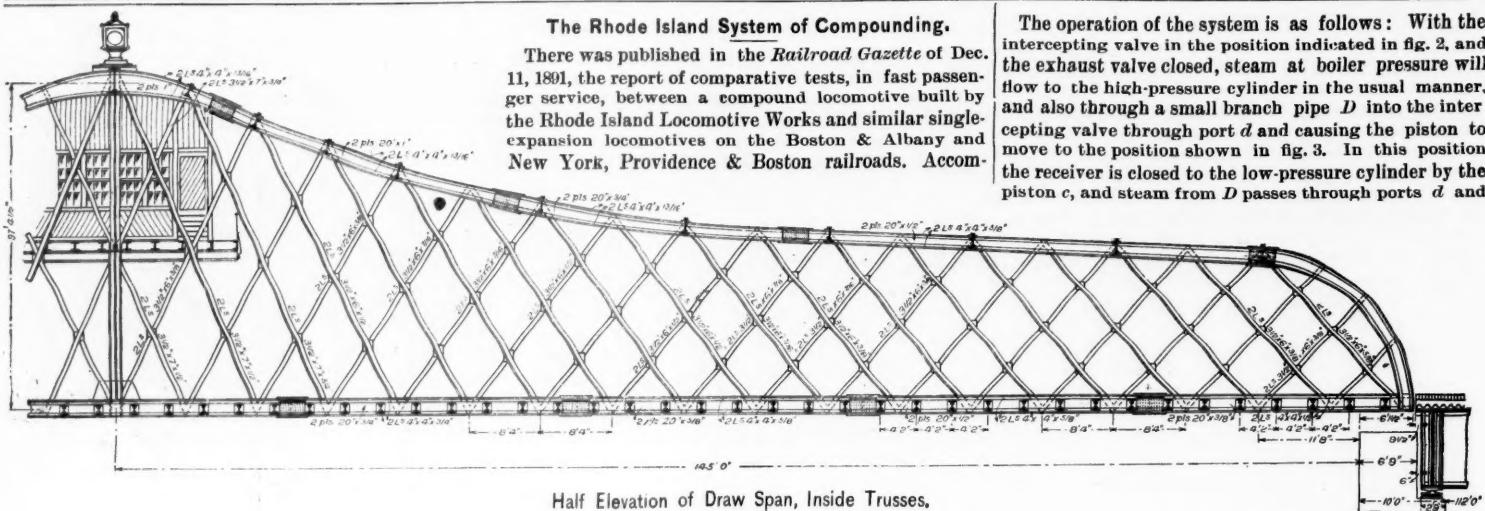
THE THIRD AVENUE BRIDGE OVER THE HARLEM—NEW YORK CITY.

The floors of the arcades and approaches will be granite blocks on concrete bed.

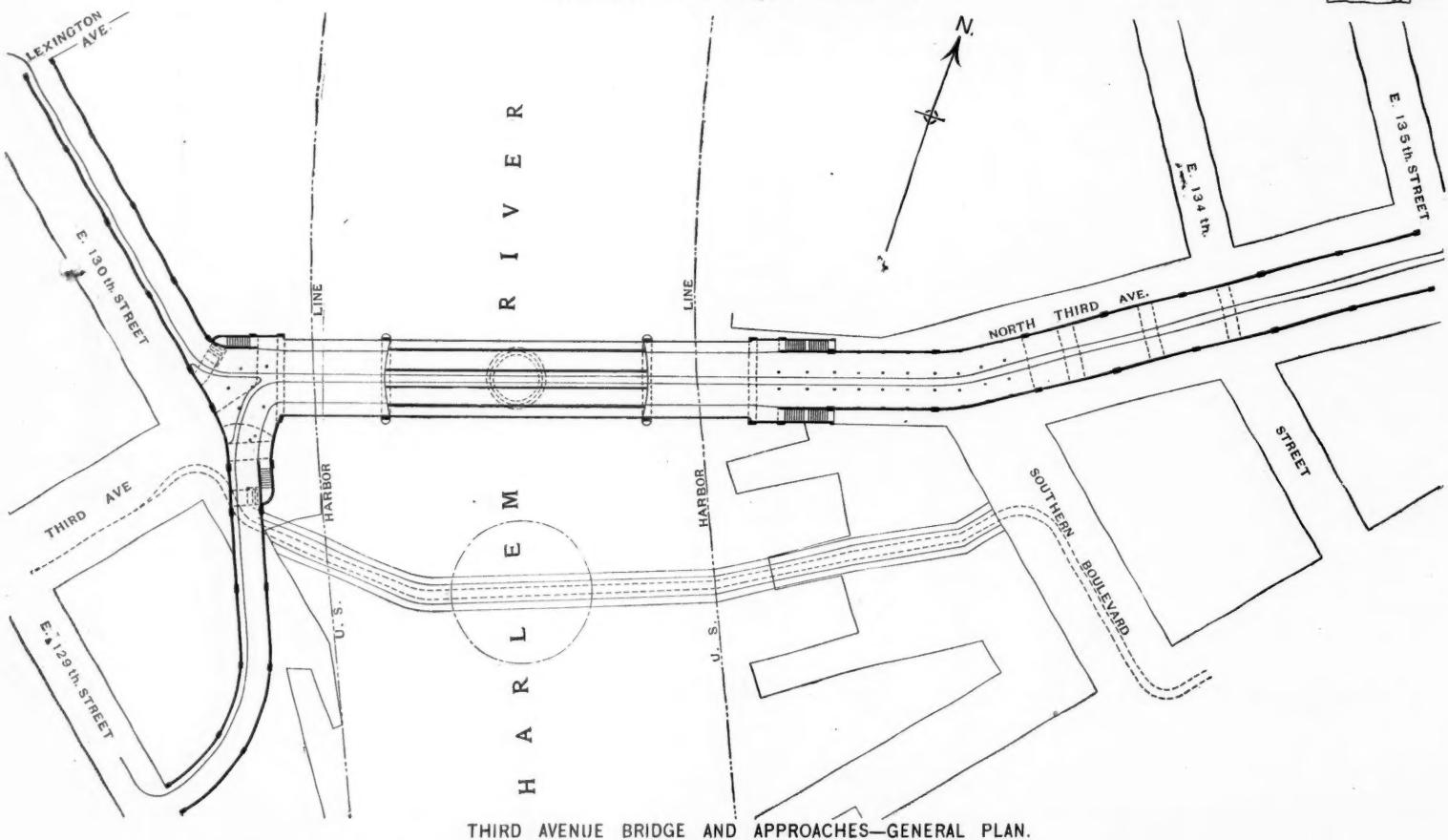
The circle of cast iron columns which forms the present pivot pier will have to be removed, and the caisson, which, as we have said above, is annular, is so arranged that the air chamber will enclose these columns, and they will be removed as fast as the caisson sinks, so as not to interfere with the roof or sides.

The contract includes a temporary bridge, the position of which is shown on the plan, as well as the removal of this and of the old bridge. The temporary bridge will be a draw on a pile pier, operated of course by hand gear. The machinery will be transferred from the old





### Half Elevation of Draw Span, Inside Trusses.



THIRD AVENUE BRIDGE AND APPROACHES—GENERAL PLAN.

bridge as soon as traffic across that is abandoned, and used afterward to operate the temporary draw. This temporary draw will be made of steel girders.

The clear height being fixed by law at 24 ft. above high tide the grades of 3 ft. per 100 on the approaches can only be got by using a thin floor, which means floor beams very near together. This again was considered to require lattice main girders with close intersections to support the floor beams. As the bridge is a conspicuous object, in a well built-up part of the city, its architectural treatment becomes a matter of importance. Lattice girders can be made with graceful curves whose effect is more pleasing than the rigid lines of pin-connected trusses. In the approaches an attempt has been made to get the good effect which comes from the repetition of round arches. Where there is no room for arches, retaining walls of granite with massive buttresses have been used. The rock face of the granite walls emphasizes the strength of that noble material; and no fine-cut stone is used except for copings and balustrades. As this bridge is built for a large present traffic and one which is constantly increasing, its width is great, comprising two 20-ft. roadways, one 20-ft. electric carway, and two 10-ft. sidewalks. It is believed to be the widest road bridge with a swing draw yet designed.

Eight bids have been received for the construction of this bridge. Each bid contains 118 items and is for everything, including painting and lighting. The lowest bidder was John J. Hopper, of New York, and the contract was awarded to him on Sept. 12. The bids were for granite or for gneiss stonework, and were as follows (cents omitted):

We now illustrate the system as arranged at the present time and as applied to a compound passenger locomotive recently built for the New York, New Haven &

The system includes an exhaust valve *F*, by which the exhaust from the high-pressure cylinder can be turned directly into the stack from the receiver passage; an intercepting valve, shown in cross-section in fig. 1 and in longitudinal section in figs. 2 and 3, which opens automatically when steam is admitted to the dry pipe by the opening of the throttle, and closes only when the pressure of steam in the receiver reaches a predetermined amount, and which, when open, allows steam to pass through by way of ports *d* and *e* into a cavity beneath, and a reducing valve placed in the cavity mentioned, through which steam is admitted into the low-pressure steam chest.

*e* and reducing valve *B* to the low-pressure steam chest the reducing valve being so proportioned as to reduce the steam from boiler pressure in the inverse ratio of the piston areas. The pistons of the reducing valve are so proportioned that they will move to the compound position shown in fig. 2 when a predetermined pressure in the receiver is attained by repeated exhausts from the high-pressure cylinder.

The action of the engine may be changed at any time at the will of the engineer from compound to single expansion by opening the exhaust valve  $F$ , and allowing exhaust steam from the high-pressure cylinders to pass directly from the receiver to the stack. Under these conditions the pistons of the intercepting valve will remain in the position shown in fig. 3 until the exhaust valve is closed and the receiver pressure allowed to increase to the amount required to change the position of the valve. A dash pot,  $C$ , shown at the right of fig. 2, prevents injurious shocks to the interrupting valve.

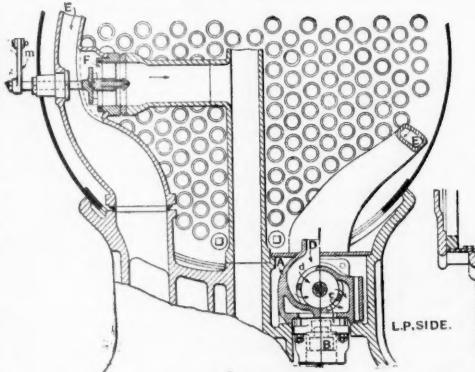


Fig. 1.

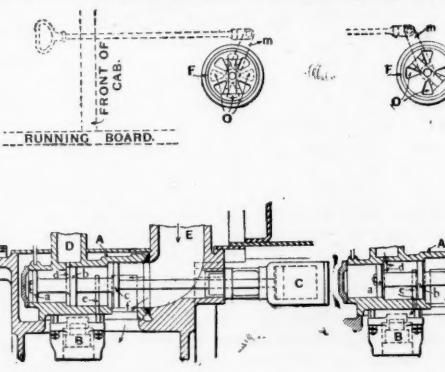


Fig. 2.



### Intercepting Valve for Compound Locomotive.

It will be observed that by the use of this arrangement a high starting power is obtained, and that the increase in power, instead of being confined to the low-pressure cylinder, is shared by the high-pressure cylinder in such a way as to practically equalize the work done under all conditions.

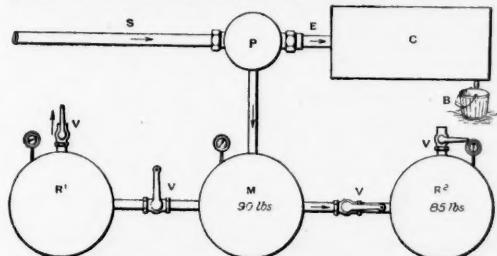
#### Comparative Tests of Air Pumps.

The Westinghouse Air Brake Co. has introduced to the public its new  $9\frac{1}{2}$ -in. simple air pump by publishing in pamphlet form results of comparative tests of it with the New York Air Brake Co.'s No. 2 duplex air pump. The former is a single action one-steam and one-air cylinder pump,  $9\frac{1}{2}$  in. diameter, while the latter is a duplex pump, compressing air by two successive operations; cylinders 7 in. diameter. The Westinghouse company has been to a good deal of trouble and expense to prove in a practical way, what a mathematical investigation of the two pumps would have shown at once. The  $9\frac{1}{2}$ -in. cylinder pump with a piston travel of 118 ft. per minute should perform more work with the same steam pressure than two 7-in. cylinders with 180 ft. piston travel per minute. The ratio of efficiency of the two engines is about as 1 : .8, if the mechanisms of both were quite perfect. This is approximate to the results obtained and published in the circular. According to the circular the  $9\frac{1}{2}$ -in. pump required 8,906 seconds to compress a cubic foot of air, while the 7-in. duplex required 10,524 seconds, both using nearly the same amount of steam. This disproved the general opinion that a duplex pump is more economical than a simple acting pump. The popular belief is that, since a duplex pump is an economical and efficient device for pumping water, it must be equally so for pumping air. But such a conclusion is erroneous. Air is very compressible, while water is but slightly so. When air is compressed its temperature is raised, which heats the pump and its working parts, and this heating increases the expense of operation as well as tending to injure the pump.

The heating effect is greater when the air is compressed by two immediately successive operations, as in the duplex pump, than it is if raised to the same pressure by one movement, as by a direct acting pump. This also could have been shown by mathematical computation of the resulting temperature from the formulae based upon the adiabatic laws of gases, without having gone to the expense of practical experiments; but such theoretical investigations are not generally appreciated, hence the necessity of a practical demonstration. The heating of the duplex pump reported in the circular is what should have been expected, and its tendency to heat does not depend upon the mechanical details of the pump, but upon the principle upon which it works. The temperature of 442 degrees for the single acting pump and of 515 for the duplex pump, a difference of 73 deg., is not surprising.

The manner of conducting these tests is interesting and will recommend itself to scientific men. To test the duty of a pump it is necessary to put upon it a load which can be maintained uniformly. This was done by having the pump worked against a constant pressure of 90 lbs. A comparison of the quantity of air pumped against such pressure will represent the relative efficiency of such pump. To measure the amount of air pumped was a matter of no little trouble. The work of the hydraulic pump is easily measured by weighing or measuring the water at atmospheric pressure, but air cannot conveniently be measured at such pressure. It is more conveniently measured at a higher pressure.

The apparatus is shown in the accompanying diagram. Steam was admitted from a boiler at 140 lb.



pressure to the pump *P*, which exhausted into a surface condenser *C*, and the condensed steam was caught in the bucket *B*. The quantity of water from the condenser was taken as the measure of the steam consumed. The pump was connected with a main reservoir *M*, which is constantly maintained at 90-lb. pressure. This main reservoir was connected with two receiving reservoirs, *R*<sup>1</sup> and *R*<sup>2</sup>, which measured the amount of air pumped. When one reservoir as *R*<sup>2</sup> was raised to a pressure of 85 lb., the valve between it and *M* was closed and the valve between *M* and *R*<sup>1</sup> was opened at the same instant, the valve at the top of *R*<sup>1</sup> having been closed. While *R*<sup>1</sup> was being filled to 85-lb. pressure, *R*<sup>2</sup> was emptied by opening the valve *V* at the top. The number of times the reservoirs *R*<sup>1</sup> and *R*<sup>2</sup> were filled to 85-lb. pressure represented the quantity of air pumped against the pressure of 90 lb.

This seems a reasonable method of testing the duty of air pumps. It is simple and fair to competitors. It is to be regretted that the circular does not give the results of the tests more in detail so that they would be of

record for further reference and for use in investigating the adiabatic laws of air. Such practical experiments afford much useful information valuable to physicists and investigators of thermo-dynamics. They cannot be carried on with the apparatus at hand in laboratories and they are of great value to science.

#### Improvements in Shop Tools.

Every week brings with it new labor-saving devices, yet shops that are active in producing great labor-saving machines are frequently using the most antiquated tools and methods, in poorly constructed shops. To compete successfully in the production of machinery to day shops must be alive to modern improvements. Railroad shops not having usually to meet the competition of the market do not experience the necessity of cheap production and are often slow to adopt labor and time-saving devices.

Any kind of bench or vise work is expensive. The cutting or chipping of key seats and fitting of keys has been such an item of skill and cost that designers of machinery have avoided the use of them as much as possible. The Woodruff Manufacturing Company, Hartford, Conn., has patented a system of keying which has given excellent results, as proved by testimonials from some of the best shops in the country.

The key seat is cut longitudinally in the shaft by a milling cutter of the thickness of the key to be inserted, but instead of being flat in the bottom it is nearly a semicircle, such as the milling tool cuts when the bed of the milling machine is held stationary. The key is a semicircle and sets in this rounded seat projecting above the shaft enough to engage the key-way in the hub of the wheel or pulley. The operation of cutting the key seat is therefore done by machinery; it is simple and does not require skilled labor. It requires but one operation and does not necessitate the drilling of a hole for the clearance of splining tool. The keys and cutters, both of which are furnished by the Woodruff company, are made accurate to standard size and no filing is required to fit the keys. Twenty-five sizes are made and a chart is furnished which shows at a glance the proper size of key and cutter for various sizes of spindles and shafts. The accompanying illustrations fig. 1, show the cutting tool, a shaft with key seat and pulley, and three keys of different sizes. The key reaching deeper into the shaft than the ordinary pattern is more firmly imbedded, and hence capable of standing a greater strain. The figure showing a nut on the end of the shaft illustrates how this form of key permits the use of a nut the full size of shaft, and avoids the necessity of reducing the diameter by the depth of the key seat, to avoid cutting into the thread. The greatest recommendation of this key-seating system is its economy. It effects a saving of from

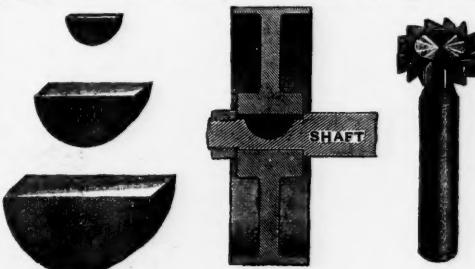


Fig. 1.

50 to 75 per cent. in cost, and is a great saving of time and trouble, and it presents a neat and workmanlike appearance.

Other time-saving tools manufactured by the same company are the "Presto" drill chucks and collets. The accompanying cuts show the relative sizes and forms. Figs. 2 and 3 show the chuck and fig. 4 the collets.

Fig. 2 shows the chuck and fig. 3 the same chuck in the spindle of a drill press. The valuable feature of the tool is that the drill or auger can be taken out and replaced by another, without stopping the spindle. The lifting of the ring with the left hand releases the collet holding the drill and allows it to drop out; the dropping of the ring locks the new collet and drill. The locking ring may be held stationary while the chuck revolves in it. A complete set is composed of a chuck and nine collets, three of each of Morse standard tapers, Nos. 1, 2 and 3. The object in having three collets of each taper is to allow a change of drills to be made without stopping to drift the drill from the collet. Where several changes of the drills or counterbores are required in a piece of work this chuck and collets are almost indispensable. The construction of the chuck is simple and it is not likely to get out of order.

The company also makes polishing arbors from  $\frac{1}{2}$  to 4 in. inclusive by sixteenths and 4 to 5 in. by eighths. The advantage of these arbors, which are flexible collars to fit a mandrel, is that they may be used on any length of piece of work and though the hole vary in size at the two ends. They save arbors used for turning which soon run out of true if used for polishing.

#### Chicago Traffic Matters.

*Freight Traffic.*—The inward freight traffic of the Western railroads leading to Chicago continues to increase; the deliveries of grain for the past week

aggregated 6,545,000 bushels, an increase of 535,000 bushels over the one immediately preceding. There was, however, a shrinkage of 842,000 bushels from the deliveries for the week ending Sept. 10, 1892. The shrinkage in flour was also quite heavy, being 26,622 barrels. The loss, however, was compensated by an increase in mis-

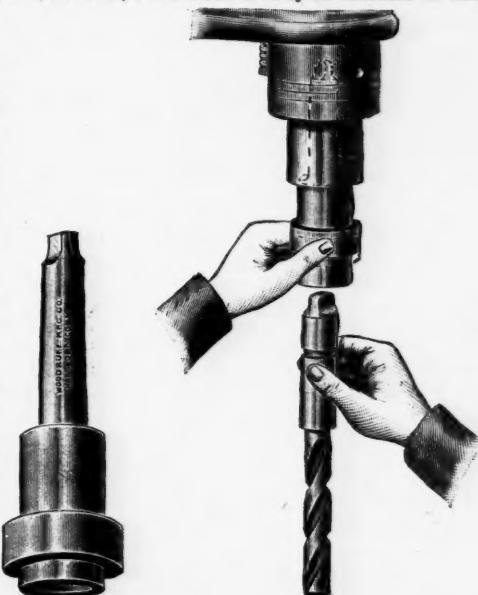


Fig. 2.



Fig. 3.

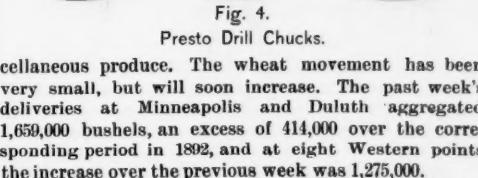


Fig. 4.  
Presto Drill Chucks.

cellaneous produce. The wheat movement has been very small, but will soon increase. The past week's deliveries at Minneapolis and Duluth aggregated 1,659,000 bushels, an excess of 414,000 over the corresponding period in 1892, and at eight Western points the increase over the previous week was 1,275,000.

The outward traffic from Chicago showed a material gain over any week since the close of the jobbing trade at mid-spring. Shipments of coal from Chicago and Milwaukee are heavy.

The following were the deliveries of flour and grain at Chicago for the week ending Sept. 9 and same time in 1892, and the amount brought by each road:

By—	1893.		1892.	
	Flour.	Grain.	Flour.	Grain.
C. & N. W. ....	9,378	387,000	13,082	1,042,000
Ill. Cent. ....	2,250	954,000	300	94,000
C. R. I. & P. ....	9,750	890,000	3,250	838,000
C. B. & Q. ....	9,671	1,753,000	19,514	1,611,000
C. & Alton ....	13,500	406,000	20,350	405,000
C. & E. Ill. ....	900	172,000	.....	375,000
C. & M. & St. P. ....	15,450	593,000	15,100	786,000
Wabash ....	150	381,000	2,085	350,000
C. & G. W. ....	11,739	166,000	25,329	365,000
A. T. & S. Fe. ....	825	220,000	125	555,000
L. N. A. & C. ....	.....	32,000	.....	55,000
Totals. ....	73,613	6,454,000	100,235	7,296,000

The deliveries of carloads of grain and livestock at Chicago by the Western roads for August and for the corresponding time last year compare as follows:

	1893.		1892.	
	Grain.	Livestock.	Grain.	Livestock.
Cars. ....	Cars.	Cars.	Cars.	Cars.
A. T. & S. Fe. ....	1,115	1,921	2,744	2,372
C. B. & Q. ....	4,375	2,125	7,683	7,189
C. R. I. & P. ....	3,513	3,026	4,002	2,590
C. & M. & St. P. ....	1,753	1,616	2,766	2,055
C. & N. W. ....	2,535	3,284	3,307	3,053
C. & A. ....	1,691	2,125	3,597	2,172
C. & E. Ill. ....	1,000	1,473	1,911	323
Ill. Cent. ....	2,858	1,195	5,243	1,264
Wabash ....	1,436	1,664	2,108	2,135
Wis. Cent. ....	.....	674	9	462
C. & G. W. ....	682	712	1,566	740
Other roads. ....	736	4,811	3,705	1,118
Total Cars....	22,297	23,626	38,611	25,413

The shipment of live stock by the eastbound roads for August for the past four years compare as follows:

	1893.		1892.	
	Cars.	Cars.	Cars.	Cars.
B. & Ohio. ....	165	189	319	682
C. & G. Trunk. ....	1,912	1,382	961	1,374
C. & Erie. ....	304	1,29	259	64
Lake Shore. ....	2,092	1,554	1,491	1,188
Mich. Cent. ....	534	757	1,001	710
N. Y. C. & St. L. ....	270	698	1,286	1,502
P. C. C. & St. L. ....	50	93	121	61
P. Ft. W. & C. ....	780	1,128	998	2,117
Totals. ....	5,197	5,920	6,436	7,788

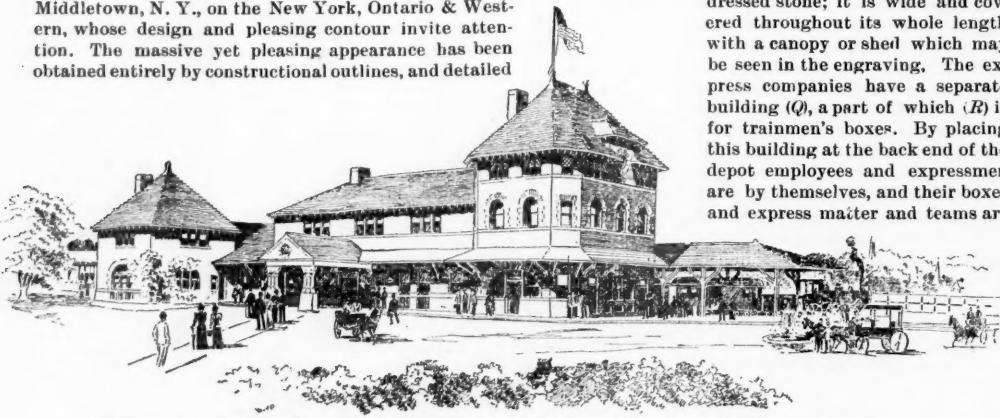
*Passenger Traffic.*—The Chicago railroads con-

tinue to maintain the previous large volume of passenger traffic, and some lines state that the past week's business was the largest they have ever handled in an equal number of days. Earnings will probably continue heavy for several weeks.

The passenger agent of a line having direct connections with states beyond the Missouri said: "The great bulk of our passenger business comes from points east of the Mississippi and Missouri. The volume of travel from Kansas is small, and from Colorado it is very much less than during June, when the rates were higher. Monetary and industrial conditions have doubtless checked business from there, and no rate we could make without actual loss would bring a material increase in travel from there."

#### Middletown Passenger Station of the New York, Ontario & Western.

Illustrations are given herewith of the new station at Middletown, N. Y., on the New York, Ontario & Western, whose design and pleasing contour invite attention. The massive yet pleasing appearance has been obtained entirely by constructional outlines, and detailed



Passenger Station of the New York, Ontario & Western Railroad at Middletown, N. Y.

decorations are almost entirely wanting. The building is substantial and convenient, yet elegant, and its cost was moderate. The general plan and arrangement were suggested by Mr. E. Canfield, Chief Engineer of the railroad, while the architectural features were wrought out by Mr. Bradford L. Gilbert, of New York. The material is red brick, with trimmings of red sandstone from Scranton. The stone evidently was selected chiefly for its artistic beauty, for it is so friable that it is likely to weather and disintegrate in exposed places. It seems unfortunate in such a *quasi*-public building to sacrifice even a grain of durability to artistic effect. The stone is dressed rock-faced and has been skillfully employed in the trimming. Its most effective use is in the large semicircular arch rings over the doors and windows. These arches afford plenty of light to the rooms on the first floor, though it is shaded by a wide platform shed. This is a feature worthy of special note, for good light is something that is often overlooked in designing station buildings.

The station is 175 ft. long, 35 ft. wide, with a kitchen extension 30 x 30 ft., and an express annex building 14 x 31 ft. The total length of the platform annex is 285 ft. The main part of the structure contains a general waiting-room (J) 30 x 32 ft., with a massive fireplace and mantel. Seats are built around the room, and in the center of the room there is a large bench or settee built in the shape of an oval. For the ladies there is a small waiting-room (H) 15 x 17 ft., provided with seats and comfortable chairs; adjoining it is a toilet-room (G) 9 x 13 ft. At the main entrance to the general waiting-room is a covered carriage-way, a convenient feature for stormy weather. The ticket and telegraph office (I), 15 ft. square, is large and commodious, with the usual bay window in front to enable the operator to see approaching trains. This view, which should be free and unobstructed, is cut off somewhat by the projection of the upright, octagonal part at one end, and by the express building at the other end, of the structure. This might have been avoided without destroying the architectural appearance of the building, and no reason is to be found in the surroundings for not doing so. There are two windows opening respectively into the ladies' room and the general waiting-room, which are near together and may be attended by one man without changing his position.

The restaurant (K) is by far the largest and most attractive room of the first floor. Its large, circular windows filled with plate glass, its open fireplace and the hardwood finish throughout give it a cheerful, inviting and comfortable appearance that passengers are certain to appreciate. It is 32 x 86 ft., with a 16-ft. ceiling and a large skylight, and has over 200 running feet of lunch counter. Annexed to the restaurant is a kitchen 30 x 30 ft., two stories high, which contains a pantry (O) 11 x 27 ft., a cooking-room (P) 17 x 19 ft. and a cold storage room (S) 8 x 14 ft. The second story of the kitchen annex is divided into bedrooms about 12 x 14 ft. Its basement contains heating and cooking apparatus for it and the restaurant. This heating system is independent of that for the rest of the building, so that the expenses of the hotel may be kept separate. The cellar of the building is 14 x 35 ft., and is equipped with 20-H. P. boilers for heating the building and supplying its lavatories with hot water. There are also storage rooms for coal and other necessities. At one end of the building and nearest the

track is the baggage room (A) 15 x 16 ft., and to the rear of that the station master's office (B) 10 x 15 ft., a trainmen's room (F) 16 x 16 ft., and a lobby (C) 10 x 12 ft., with lockers. Next to the baggage room, and between it and the hall and stairway are the gentlemen's closets, which open out upon the track platform.

The second and third stories are devoted to railroad business, and will contain offices for the chief engineer, superintendent of motive power, the train dispatcher, and their numerous assistants. The third story also contains three large offices or living rooms for railroad officers. Both floors are provided with large toilet and bath rooms, furnished with the most modern appliances and furnishings. The offices have fire proof vaults built up from the foundations.

On the outside of the building in the recesses formed by the large stone arches are built seats which will be much appreciated by passengers not desiring to go inside. The platform is of cement curbed with neatly dressed stone; it is wide and covered throughout its whole length with a canopy or shed which may be seen in the engraving. The express companies have a separate building (Q), a part of which (R) is for trainmen's boxes. By placing this building at the back end of the depot employees and expressmen are by themselves, and their boxes and express master and teams are

The bridge company had done all the railroad's bridge work for 12 years or more. Neither the proprietor of the bridge works nor his chief engineer gave any attention to the work on this bridge. The proprietor understood that he was to furnish the best quality of work in the best manner, and that was all there was to it. He had an outside superintendent, Reed, in charge of several bridges, one of which was this bridge. Reed was considered an entirely competent man. So far as can be gathered from the testimony he is not an educated engineer, has no knowledge of bridge stresses or designing, but is a practical bridge builder of many years' experience. He visited the bridge from three to six times a week, and gave directions to his assistant, Belville, foreman of the bridge gang. The foreman is a boilermaker and bridge mechanic, who professes no knowledge of the theory of bridges or of their design. He had immediate charge of the men, and in the absence of the superintendent directed the work. He claims to have believed the bridge was perfectly safe. He disputes the testimony of the superintendent as to his instructions to keep the rivet holes bolted or pinned. The superintendent being away the foreman called his men off from the bridge to unload some iron from a car. The dinner hour came, the men and the foreman went to their dinners and the bridge fell.

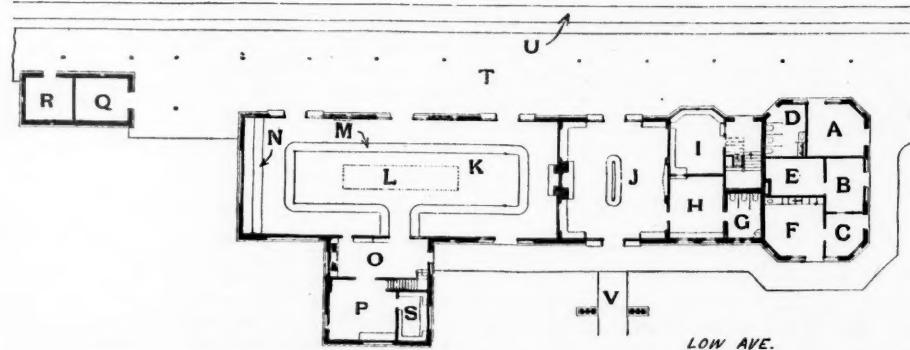
The bridge was a riveted triple intersection through truss bridge with inclined end posts of about 108 ft. span. It had 11 panels of about 9 ft. 8 in. each, and was built on a skew. The top chord and end post were made up of two vertical web plates, two angles at the top and a variable number of cover plates riveted to the angles. The bottom of the web plates was not latticed except in the end posts. The end post had one cover plate, the end panel of top chord had none, but was latticed and the upper chord had one or two covers.

The rest of the trusses were being strengthened by adding cover plates; to do which it was necessary to temporarily disconnect the old cover plates from the angles for a short distance by driving out the rivets, then putting on new plates and reriveting the plates to the angles. When these rivets were removed the bridge was necessarily greatly weakened.

Prof. G. F. Swain, the Bridge Engineer of the Massachusetts Railroad Commissioners, reports that the ill-fated train came upon the bridge when the upper chord of one of the outside trusses was for a considerable distance in this weakened condition. The old cover plates had been disconnected from the angles for a distance of 25 ft. throughout the second and third and a part of the fourth panel, and apparently no bolts put in, in the place of the rivets cut out. The lateral bracing was evidently disconnected at the four panel points, or, if connected at all, it was done very insecurely. The bridge had no false works under it, trains had no instructions to run slowly. The foreman had been instructed to take advantage of time between trains, and had been given a red flag, but not a time table. It was not a usual thing to stop trains while doing repairs of this kind.

#### Collision at Colehour, Ill.

Autting collision of passenger trains on the Pittsburgh, Fort Wayne & Chicago near Colehour, Ill., on the morning of Sept. 7, resulted in the death of 11 passengers and one tramp, and the injury of seven passengers and three trainmen. Both trains were running at full speed, and the baggage car of the eastbound train was forced against or through the smoking car behind it in such a way as to completely crush the latter. It



Passenger Station of the New York, Ontario & Western Railroad at Middletown, N. Y.

verbal understanding between the railroad and bridge company, the only definite terms of which were that the railroad company was to pay a certain price for the materials, use of tools and labor, and that the work was to be first-class. There were no provisions as to supervision or inspection; the Bridge Engineer had no supervision over it, gave no directions about it, and did not go to the bridge during the repairs, nor was he represented by an assistant. He had told the bridge company's superintendent to be careful, but had given him no particulars. The Chief Engineer and his principal assistant were, according to the testimony, equally as ignorant and unconcerned as to what was being done or by what means. The Roadmaster and Bridge Inspector did not understand that the repair of bridges was any of their business.

was in this car that most of the fatal injuries took place. The westbound train was a local from Valparaiso, and the eastbound was an express train going on to the Pittsburgh, Cincinnati, Chicago & St. Louis. The collision occurred at 8:40 a. m. It is said that the dispatcher at Fort Wayne, named O'Connor, made a mistake in issuing a meeting order. The westbound train had an order to meet the eastbound at Colehour, but the eastbound train passed that station on time, having the right to the road in the absence of orders. As the duplicate system of train orders is used on the Pennsylvania lines, it would seem that the error was in sending the order to the inferior train before it had been sent to the superior train. A dispatch from Fort Wayne, Sept. 9, stated that O'Connor was overcome with grief and had been secreted by his friends.

**Some Hydraulic Machinery at the World's Fair.**

A good showing of hydraulic machinery is made at the World's Fair by R. D. Wood & Co., of Philadelphia. It includes hydraulic machinery for shop use, hydrants, valves and fittings, water-pipe and gas machinery. We mention a few of the machines.

The machinery is operated from a duplex pump with rams  $\frac{1}{2}$  in. in diameter and stroke of 18 in., and exerting a pressure of 750 lbs. per square inch, at which pressure the traveling crane is intended to be worked, while the remainder of the machinery is intended to be operated at a pressure of 1,500 lbs. per square inch. The traveling crane is of 15,000 lbs. capacity, about 25-ft. span, and is mounted on runway girders extending the whole length of the space, about 60 ft. The crane is operated by stationary hydraulic cylinders, the traveling cylinder being bolted to the runway girder, and consisting of a long brass tube in which works a piston, packed with hemp packing. The piston rod extends through each end of the cylinder and is attached at the ends to crossheads mounted on the runway girder and carrying two rope sheaves working in bronze bearings. The ropes pass around similar fixed pulleys at the end of the girders and lead back to the ends of the bridge. The hoisting and traversing cylinders are placed together in a vertical position at the end of the space occupied by the firm. The power from these cylinders is also transmitted to the bridge by means of ropes and sheaves. The different cylinders are operated by levers placed on the columns which carry the runway girders, through long wrought-iron rods. These rods act upon piston-cup leather valves which admit water to the different cylinders as required.

The accumulator is of the inverted type with ram 8 in. in diameter and an 8-ft. stroke, and is loaded with cast iron weights resting on a flange at the bottom of the cylinder. For the purpose of raising the pressure of 750 lbs. supplied by the pump and used for the traveling crane, to the pressure of 1,500 lbs. per square inch, an intensifier is used. This is a form of hydraulic duplex pump with cylinders  $\frac{1}{2}$  in. in diameter and 24-in. stroke, placed horizontally on a channel iron bed. To the front end of the pistons are attached rams 5 in. in diameter, and passing through the ends of the cylinders. Water at pressure of 750 lbs. per square inch flows into the annular space at the front of the piston as it moves toward the opposite end of the cylinder during exhaust. As the opposite piston reaches the end of its forward stroke a small arm projecting from the end of the ram strikes a stop, which actuates the admission valve and allows water at 750 lbs. pressure to flow into the rear end of the cylinder, driving the piston and ram forward to the end of the stroke and forcing out the water around the annular space against a greatly increased pressure. As the end of the stroke is reached the admission valve closes and the water behind the piston is exhausted as the piston is again moved back by the water admitted to the front of the piston. In this way a continuous running intensifier is made possible and any desired multiplication of pressure obtained by varying the proportions.

Among the riveters on exhibition is a plate closing machine of 70 tons capacity, with 8 ft. gap, automatic action, and so arranged that the plate is closed while the rivet is being upset with pressure, in this case, of 30 tons, the rivet meanwhile receiving a pressure of 40 tons. At the proper instant the plate pressure is removed and the whole pressure automatically applied to the rivet. There is also shown a 20-ton bear type portable riveter with a 12-in. gap with a universal hanger of a new design, consisting of a combination of worm gears so arranged as to allow the riveter to be turned to any position. This machine is suspended from a riveter crane by means of a vertical lift through which the pressure is carried to the riveter.

A hydraulic punch, with a 30-in. gap and capable of punching  $\frac{1}{2}$ -in. holes in  $\frac{1}{2}$ -in. plates is fitted with return gear and adjustable stops for regulating the length of the stroke, which is made extra long for use as a riveter. There is also a shear of somewhat different design as to valve gear and general appearance, and equipped with a swinging jib crane for handling plates.

**A Fast Run on the Pan Handle Road.**

A remarkable run of 42 miles at the rate of 70.96 miles an hour (probably the fastest yet recorded for the distance) was made on Aug. 28 over the Louisville division of the Pittsburgh, Cincinnati, Chicago & St. Louis Railway by train No. 12, consisting of a baggage car, two passenger cars, a Pullman chair car and a Pullman sleeping car, and hauled by "Class P" engine No. 120, with 68-in. drivers.

The train left Indianapolis 26 minutes late, and between that point and Seymour was delayed 4 minutes by contractors erecting a bridge north of Edinburg, 4 minutes at Cornbrook by train No. 17, 3 minutes at Columbus by orders,  $\frac{1}{2}$  minutes at Seymour by orders, and 1 minute by a mule on the right of way. Station stops were made at Columbus, Seymour and Jeffersonville, and a crossing stop at the Indianapolis Belt, one at Franklin, two at Seymour, one near Ohio Valley and one at North Tower. Four minutes were consumed in crossing the Louisville bridge, and the train arrived eight minutes late at Main Street Station, Louisville. The distance from Indianapolis to Louisville is 100.96

miles, and the time consumed in running was 140½ minutes.

From Seymour to North Tower, a distance of 48 miles, no stops were made, and from mile post 62 to mile post 104 the run was made in 35 minutes and 34 seconds, or at the rate of 70.96 miles an hour. The highest speed recorded was between mile posts 90 and 91, the mile being run in 42 seconds, or at the rate of 85.71 miles an hour, and the lowest speed was 60 miles an hour. Three miles were made at a rate of 81.81 miles per hour, and four consecutive miles at a rate of 82.75 miles per hour. Nine consecutive miles were made at a speed of more than 72 miles an hour and at an average speed of 79 miles an hour.

Below is given the time in seconds per mile for each of the 42 miles: 55, 53, 51, 48, 47, 47, 48, 58, 58, 49, 51, 52, 50, 54, 50, 60, 53, 50, 50, 57, 60, 55, 45, 47, 44, 44, 42, 44, 48, 40, 47, 53, 58, 50, 53, 52, 50, 51, 52, 49.

Time was taken by H. J. Miller, Superintendent of the Louisville Division; I. M. Lindley, Trainmaster, and J. C. Cox, Foreman of the Louisville bridge. There are no sharp curves or heavy grades on the run, the maximum grade being about 27 ft. per mile. The total fall in the 42 miles over which the fast time was made is 109.3 ft., or an average of 2.6 ft. per mile.

**An Early Time-Table.**

The time-table reproduced herewith is of some historical interest, as being one of the first issued for the Union Pacific Railroad. The names signed to it will be recognized as having long been prominent in railroad

stopper. The upper end of the neck stands 5 in. above the top of the outside vessel. The glass bell, or "combustion chamber," as it may be termed, rests upon a metal base, to which it is held by means of spring clips, the bottom of the chamber being provided with an exterior rib by means of which the clips are made fast. The base is perforated, and at the centre is mounted a short tube, for the reception of a crucible, in which the combustion takes place. The crucible is made of platinum. It is surrounded by a layer of non-conducting material, which is placed between it and the outer metal. A small glass tube is inserted in the stopper at the top of the neck, and this is carried down to the interior of the combustion chamber. It is fitted somewhat loosely, so that a slight pressure will move it up or down, and thereby adjust its lower end to any height desired above the crucible. The tube has a slight lateral movement also, so that it may be directed, at the will of the operator, toward any part of the crucible. This tube is connected with a tank containing oxygen gas, and through it a current of gas is passed, so as to enable the combustion of the coal to be carried on under water. The pressure of the gas drives out the water which would otherwise fill the chamber, and keeps its level below the base. The products of combustion rising from the crucible pass downward through the perforations in the base, escaping around the edge of the base, and finally bubbling up through the water, and emerging at its surface. A wire screen is secured to the neck of the combustion chamber, extending to the sides of the outer

UNION PACIFIC RAILROAD PLATTE DIVISION. TIME SCHEDULE NO. 14. TO TAKE EFFECT SUNDAY, AUGUST 30, 1868, AT 12:05 O'CLOCK, A. M. <i>For the Government and Information of Employees Only. The Company reserves the right to vary therefrom at pleasure.</i> TRAIN'S WILL RUN DAILY.											
BOUND WEST.				NAMES OF STATIONS.				BOUND EAST.			
NO. 7. FREIGHT.	NO. 5. FREIGHT.	NO. 3. EXPRESS.	NO. 1. FREIGHT.	NO. 2. FREIGHT.	NO. 4. EXPRESS.	NO. 6. FREIGHT.	NO. 8. FREIGHT.	NO. 7. FREIGHT.	NO. 5. FREIGHT.	NO. 3. EXPRESS.	NO. 1. FREIGHT.
6:30 P. M.	1:00 P. M.	4:20 P. M.	12:05 A. M.	ONAH	9:01 A. M.	9:30 A. M.	1:30 P. M.	11:15 P. M.	1:00 P. M.	4:20 P. M.	12:05 A. M.
6:45 "	1:15 "	4:30 "	12:20 "	SUMMERSIDING	9:02 A. M.	9:15 "	1:15 "	10:55 "	1:15 "	4:30 "	12:20 "
7:30 "	2:00 "	4:45 "	1:00 "	PAPILLION	9:03 A. M.	9:30 "	1:30 "	12:40 "	1:10 "	4:45 "	1:00 "
8:45 "	3:10 "	5:40 "	2:15 "	ELOCHORN	9:04 A. M.	2:15 "	8:05 "	11:40 A. M.	2:45 "	5:40 "	2:15 "
9:15 "	3:35 "	5:55 "	2:45 "	VALLEY	9:05 A. M.	1:45 "	7:50 "	11:15 "	3:00 "	6:15 "	3:35 "
10:15 "	4:30 "	6:45 "	3:35 "	FREMONT	9:06 A. M.	12:45 "	7:20 "	10:20 "	4:45 "	7:00 "	4:35 "
11:30 "	5:35 "	7:30 "	4:45 "	NORTH DEND	9:07 A. M.	1:30 P. M.	6:35 "	9:25 "	5:35 "	8:00 "	5:35 "
12:35 A. M.	6:45 "	8:00 "	5:50 "	SHIEL CHEESE	9:08 A. M.	10:05 "	5:50 "	8:20 "	4:30 "	7:10 "	5:50 "
1:45 "	8:00 "	8:45 "	7:10 "	COLUMBIUS	9:09 A. M.	9:45 "	5:10 "	7:10 "	3:10 "	8:00 "	7:10 "
2:20 "	8:45 "	9:15 "	7:50 "	JACKSON	9:10 A. M.	7:10 "	4:45 "	6:00 "	2:30 "	9:00 "	7:50 "
3:00 "	9:30 "	9:45 "	8:30 "	SILVER CREEK	9:11 A. M.	6:15 "	4:15 "	5:00 "	3:35 "	8:30 "	7:00 "
3:45 "	10:15 "	10:15 "	9:25 "	CLAYTON	9:12 A. M.	7:15 "	3:45 "	5:45 "	12:40 "	9:00 "	8:15 "
4:40 "	11:05 "	10:45 "	10:15 "	LONE TREE	9:13 A. M.	4:10 "	3:15 "	2:30 "	11:50 A. M.	10:45 "	9:15 "
5:30 "	12:00 P. M.	11:15 "	11:00 "	CHARMAN	9:14 A. M.	3:00 "	2:35 "	2:05 "	11:00 "	10:15 "	8:30 "
6:30 "	1:15 A. M.	11:45 "	12:00 M.	GRAND ISLAND	9:15 A. M.	2:00 "	2:00 "	1:15 "	9:45 "	1:00 P. M.	11:00 P. M.
8:45 "	1:50 "	11:55 "	12:15 P. M.	GRAND ISLAND	9:16 A. M.	1:45 "	1:50 "	1:00 "	9:20 "	1:15 P. M.	11:15 P. M.
7:30 "	2:30 "	1:00 A. M.	1:00 P. M.	PAWNEE	9:17 A. M.	1:00 "	1:20 "	1:20 A. M.	8:40 "	1:30 P. M.	12:30 A. M.
8:00 "	3:15 "	12:50 "	1:45 "	WOODBURN	9:18 A. M.	12:25 P. M.	12:50 "	11:35 A. M.	8:00 "	1:30 P. M.	12:00 P. M.
8:35 "	4:05 "	1:15 "	2:30 "	GIBSON	9:19 A. M.	11:45 A. M.	12:20 "	10:40 "	7:15 "	1:45 P. M.	12:30 P. M.
9:30 "	4:45 "	1:45 "	3:15 "	KELARNEY	9:20 A. M.	11:00 "	12:00 A. M.	10:00 "	6:30 "	1:55 P. M.	12:45 P. M.
10:15 "	5:35 "	2:15 "	4:00 "	STEVENS	9:21 A. M.	10:15 "	11:35 P. M.	9:00 "	5:35 "	2:15 P. M.	1:15 A. M.
11:00 "	6:30 "	2:40 "	4:45 "	ELM CREEK	9:22 A. M.	9:30 "	11:10 "	8:00 "	4:45 "	3:00 P. M.	2:00 A. M.
12:35 P. M.	8:15 "	3:25 "	5:15 "	PLUM CREEK	9:23 A. M.	8:15 "	10:30 "	6:15 "	3:35 "	4:00 P. M.	3:00 A. M.
1:00 "	9:45 "	4:30 "	7:40 "	WILLOW ISLAND	9:24 A. M.	6:45 "	9:40 "	6:40 "	2:05 "	5:00 P. M.	4:00 A. M.
2:40 "	10:35 "	4:55 "	8:20 "	WARREN	9:25 A. M.	6:00 "	9:15 "	3:55 "	1:25 "	6:00 P. M.	5:00 A. M.
3:15 "	11:15 "	5:20 "	8:55 "	BRADY ISLAND	9:26 A. M.	5:20 "	8:55 "	3:15 "	12:50 "	7:00 P. M.	6:00 A. M.
4:00 "	12:00 P. M.	5:50 "	9:35 "	McPHERSON	9:27 A. M.	4:45 "	8:35 "	2:15 "	12:00 M.	8:00 P. M.	7:00 A. M.
5:15 "	1:00 "	6:30 "	10:30 "	NORTH PLATTE	9:28 A. M.	4:00 A. M.	8:00 P. M.	1:00 P. M.	11:00 P. M.	9:00 P. M.	8:00 A. M.

H. M. HOXIE, Ass't Sup't

S. H. CLARK, Div. Sup't

W. SNYDER, Gen'l Sup't

matters. The time-table as here shown is reduced about one-half from its original size. We are indebted to Mr. C. H. Howard, Secretary of the Safety Car Heating and Lighting Company, for the opportunity to reproduce this relic.

**A Coal Calorimeter.**

The committee report on a standard method of conducting locomotive tests, presented to the Mechanical Engineering Section of the Engineering Congress, recommended, "for standard basis on which to compare the efficiency of locomotives, the number of pounds of standard coal burned per dynamometer horse power per hour," the term, "standard coal," referring to coal in which the total heat of combustion, as determined by an oxygen calorimeter, is 12,500 British thermal units per pound. In a paper before the same section of the Congress, Mr. George H. Barrus described a form of oxygen calorimeter which has been used by him for several years in determining the value of various coals. It is similar to the one generally known as "Thompson's Calorimeter," or "Fuel Tester," and is fully described and the method of manipulation explained in Prof. Andrew Jamieson's book on "Steam and Steam Engines," the principal difference being that 3 parts of chlorate to 1 part of nitrate of potash were used in the latter instead of the oxygen, as in the former.

The calorimeter described by Mr. Barrus consists of a glass vessel 5 in. in diameter,  $9\frac{1}{2}$  in. high, which holds the water. Submerged in the interior is a bell-shaped glass vessel  $2\frac{1}{2}$  in. in diameter, 4 in. high, having a long neck  $\frac{3}{4}$  in. in diameter, which is closed at the top with a

vessel, thereby holding back the gas and preventing its immediate escape to the surface of the water.

In making a test, the quantity of water used is 2 kilograms, or 2,000 grams, and the quantity of coal 1 gram. The equivalent calorific value of the material of the instrument is 185 milligrams. One degree rise of temperature of the water corresponds, therefore, to a total heat of combustion of 2,185 B. T. U.'s. The number of degrees rise of temperature for ordinary coals varies from  $5\frac{1}{2}$  deg. to  $6\frac{1}{2}$  deg. Fahr. The thermometer used for determining the temperature of the water is graduated to twentieths of a degree, and as the divisions are about one-thirtieth of an inch apart, they may be subdivided by the eye so as to readily obtain a reading to hundredths of a degree.

In making a test it is important to have the coal well dried and pulverized, the coal and water accurately weighed, and the whole instrument at a uniform temperature. This temperature should be as much below the temperature of the room, in which the test is made, as the temperature of the instrument will be above it at the end. When the combustion is completed, the water is stirred and the temperature taken and the crucible removed and the ashes weighed. The paper gives the results of 61 tests, 17 of which are of Cumberland coals, the average of the 17 giving 13,568 B. T. U.'s per pound. Thirty-three were of miscellaneous bituminous coals, the average being 13,250 B. T. U.'s per pound, and 11 tests of anthracite, averaging 11,964 B. T. U.'s per pound. Pocahontas, New River and George's Creek coals showed the best, the first giving in one instance 14,603 B. T. U.'s, the New River 14,455, and George's Creek 14,217 B. T. U.'s, respectively, these being the best samples of each.

Extensive analyses of coals were made in 1889 and 1890 at Illinois State University, by Messrs. R. B. McConney and F. H. Clark, in which the calorimeter used was the one requiring the chlorate and nitrate of potash. Many Illinois coals were analyzed and two Pennsylvania coals. The better of the latter was Youghiogheny coal, which gave by McConney 13,940 B. T. U.'s and by Clark 14,256 B. T. U.'s.



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At 73 Broadway, New York.

#### EDITORIAL ANNOUNCEMENTS

**Contributions.**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notices of all of which will be published.*

**Advertisements.**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMN. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We chronicle in this issue one more bad train accident, a butting collision near Colehour, Ill., killing 11 passengers. This will attract more attention in the West than the three other disasters that have just occurred, and it attracts special attention in the East because it comes so close to the others, and because it happened on a line of the Pennsylvania system, which every one has come to look upon as a first-class establishment. From the evidence thus far at hand the blunder was made by an experienced dispatcher, and this meeting point had been made nearly every day since the heavy World's Fair traffic began; because the regular meeting point was suitable only for trains of ordinary length. Collisions due to the mistakes of dispatchers occur frequently, but this is the worst one of that class for many years. It will call attention to the weakness which exists in the "American" dispatching system, even under the most favorable circumstances, and will tend to create a demand for the staff system or for the use of the block system on single track, which, as we have heretofore pointed out, is a valuable safeguard against butting collisions. When passengers are killed by the dozen the lack of operators at meeting points is a poor excuse for not adopting the safest methods. With side tracks and facilities as they are, most single track roads would have to put their passenger trains on slower schedules if they were to adopt the staff or anything like it; but slow time is preferable to the horrors of a collision like this, and people are being forced to consider the alternative.

The evidence taken in the Chester bridge investigation is summarized in another column, and it places the blame clearly upon the engineering department of the road. The head of the department, the chief engineer, did not testify at any of the hearings and seems to have said nothing for publication; but the public will be compelled to hold his department responsible, and, in the absence of any contradiction of the evidence given at the hearing, will have to look to the head as the person responsible. The work was carried on in the name of the Boston & Albany Railroad, upon its property and by its orders, but no officer of the road from the President down to the day laborer pretends to be responsible for the results, or is willing to assume that it was his business to look after the work. The counsel of the road, sitting by, offers no contradiction to this testimony. This condition of affairs is lamentable, to say the least. Such an utter misunderstanding as to duties and responsibilities, such a "do-as-you-please" authority to a so-called contractor, without instructions, specification or specific terms of agreement are beyond a reasonable explanation. The railroad company and the contractor point their fingers at each other and seek to evade responsibility by explaining that they each supposed the other was looking after the work. They are both culpable and it will be extremely difficult for either of them to explain why such a piece of work was entrusted to men

so incompetent to undertake it. Even if we assume that Superintendent Reed was a competent man for his place the fact stares us in the face that he had on hand three bridges at once, and both the bridge company and the railroad officers must have known of this.

This being so, both must admit that they knew that the foreman, Belville, shown to be incompetent, was the only man in constant direct charge of the work.

It may well be questioned if the Bridge Company whose men were doing the work, strictly bears the relation of a contractor to the railroad. The work appears to have been done under a general contract of hiring, by which the road was to pay for the materials, use of tools and for the labor of the men. There were no provisions as to supervision. The contract was not for a result, but for materials and days' labor. The Bridge Company's foreman employed the men, and in the absence of instructions from the company was supposed to direct their operations. Something more than the fact that the men were hired and paid by the Bridge Company is necessary to establish the relations of independent contractor between it and the railroad company. Would-be contractors have been declared the agents or servants of companies on less grounds than exist in this case.

The practice of repairing or strengthening bridges in the manner described is one that few engineers would recommend or allow, even under the best of supervision. To rupture or disintegrate any of the members of a bridge is a very dangerous thing to undertake. Not a bar, rod, pin or bolt is put into a bridge but is for strength and safety; and it is the height of imprudence to cut, take out or dismember any part without supporting it upon false works or stopping the traffic over the bridge. That any reasonable man could sever the cover plates from the angles and web plates of a compression member for more than two and a half panels of a bridge, with heavy trains running over it at full speed, seems incredible; and that an engineering department and a bridge company could delegate such a task to such an utterly incompetent man or men is even more inconceivable.

#### The Future Motive Power for Elevated Railroads.

In the *Railroad Gazette* of Sept. 1 a correspondent, "Conservative," while speaking about the use of duplex engines for elevated railroads, which was the subject of an editorial in these columns, has written that

"One serious defect of the bogie type of engines would seem to be the necessity of using small wheels which would interfere with the increase of speed, and without greater speed the elevated lines must suffer in competition with street surface lines, which have materially increased their speed."

It will perhaps be well to answer this and other points made in the letter. In the first place, duplex and bogie engines can be made with 5-ft. wheels, which are quite large enough for any speed that will be attained on an elevated road for a long time to come. A large wheel is a disadvantage on an elevated road on account of the frequent stopping and starting of trains.

So far as the increase of speed is concerned, it is the average speed between terminals to which our correspondent refers, and that is more dependent upon the quickness with which the trains attain the maximum speed than upon the maximum speed itself. The principal loss of time when stations are close together is while accelerating and stopping the trains, not while running at the maximum speed. With a quick acting automatic brake the time formerly lost in stopping is practically saved, and with the best modern brake apparatus, as on the "Alley" elevated road in Chicago, the time that can possibly be saved by any improvement in stopping apparatus is exceedingly small. The trains are now stopped as rapidly as they can be with comfort to the passengers. Very little increase of average speed can be expected in the future from improved stopping appliances.

The distance run at the present maximum speed of 30 miles an hour is so small, when the stations are so close together as in New York or Chicago, that it is scarcely of any moment what the maximum allowable speed be set at, for the reason that with a loaded train it is difficult to reach the maximum speed now allowed in the short distance between the starting point and the point of brake application, except for the parts of the road where there are favoring grades or long distances between stations. It is practically true, then, that no substantial increase of average speed can be hoped for in the future by increasing the maximum allowable speed between stations. However, if the time used in reaching the maximum speed remains the same as now and the maximum be increased, there may be a substantial saving in time and a marked increase in average speed over the line, but this im-

piles greater accelerating power in the engines, and it is from this, as mentioned before, that the major part of any increase of average speed between terminals on an elevated road with short distances between stations must arise.

The time consumed at stations is at a minimum now. The average is scarcely 10 seconds on ordinary runs and 15 seconds for crowded trains. No material increase in average speed can be expected from a saving in the time of full stops at stations.

Practically, then, the only way to gain a material decrease of the time between terminals on an elevated road with short distances between stations, is to increase the rate of acceleration. This demands more powerful, not necessarily heavier, motors.

The power of a motor to produce acceleration is limited, not by its steam power, for that can readily be made ample within the limit of weight, but by the weight available for adhesion—the weight on driving-wheels. The present style of elevated engine has 66 per cent. of its weight available for adhesion. Our correspondent granted the point we have made when he said that, with the "duplex" or "bogie" type the whole weight is available for adhesion. But it must not be forgotten that the power of the cylinder must be increased to correspond with the increase of weight on driving-wheels; and, furthermore, the action of the valves at speeds of 15 to 35 miles an hour must be improved. As it is now the whole of the present weight that is on the driver cannot be utilized at 10 miles an hour, for the reason that the cylinder power is so much reduced at that speed that there is not turning power enough to utilize the total adhesion of the drivers. Some means must be provided for getting the steam into and out of the cylinders with less loss of potential of pressure and with less back pressure and compression than is common now, before the steam engine will be equal to the electric motor in acceleration, and before any material increase can be made in the average speed over the line with steam motors.

It is a fact that these improvements in the steam engine can be made, and any good locomotive builder in this country will furnish an engine with its total weight available for adhesion and with ample cylinder power; so that the field is not clear yet for the electric motor to work without substantial competition in the matter of accelerating power. Our correspondent further says:

"The desired maximum speed of, say, 45 miles an hour has not as yet been promised even for electric motors."

There must be a misunderstanding on the part of "Conservative" about this, for on many occasions elevated engines have made 45 miles an hour with six and seven car trains in Chicago. And the electric motor has "promised" more than 150 miles an hour. It is a common occurrence in Western towns for street cars to make 25 and 30 miles an hour, and those who visited the railroad conventions this year rode on electric cars which run at 35 to 40 miles an hour as a maximum.

"Conservative" writes:

"The speed of trains must be increased, particularly for long-distance travel, and this is the chief reason why electricity is not likely to be tried on elevated lines at once."

It can scarcely be said that speed has much to do with the limits of the application of electric motors and elevated railroads at the present time, mainly for the reason that one of the most valuable features of the electric motor is that of its comparative independence of speed. The faster the ordinary electric motor runs the better is its efficiency, and in maximum speed it excels all known devices for driving mechanism. Four hundred revolutions for a steam engine is exceedingly rapid, but it is quite slow for an electric motor. The real and chief reason why electric motors are not "tried on elevated lines at once" is that no one stands ready to advance the large sum of money needed to make a conclusive experiment. The unfortunate and badly arranged trial on the Manhattan road several years ago has operated against the advancement of the electric motor in the very service for which it is best adapted. In that experiment an electric motor, having a drawbar pull of about 2,000 lbs. as a maximum was tried against a steam locomotive having a hauling power of 8,000 lbs. Manifestly, only one result could follow.

Any one of the several large electric companies in this country stands ready to-day to furnish an electric locomotive that will do all that a steam locomotive can do on an elevated road, and will guarantee in addition to show a substantial saving in fuel and cost of repairs. It is an easy task to find a street railroad willing to experiment with a new form of motor, but it is quite another matter with elevated roads. They are few in number and are managed by conservative

men who do not care to make radical changes. No more radical change can well be imagined than that from steam to electricity on an elevated road. Vast power-houses would have to be built, and the whole repair shop force reorganized. Of course, the repairs would be simpler and probably less in cost, but the same machinery could not be used except that part now used for the frames and running gear repairs. The boiler and tank, grates and smokestack, ash pan and flue machinery would not be needed. All these radical changes are foreseen by the managing officers, and although there is a probability of a great saving in total cost of hauling trains and a certainty of quicker average speed, yet the trouble and cost of the preliminary experiments and the final changes of plant and equipment are too great to be overbalanced by the outward promises of the electric system. However, there is now a tendency on one elevated road to accept an offer of a trial train, and perhaps the coming year will give the practical data that will finally settle these discussions.

If "Conservative" will follow out to a complete plan his suggestion to use "a system of electric motors applied to the car," and do away with a motor at the head of the train, he will find, instead of "simplicity of operation," a complexity that will surprise him. The duplication of parts in such a plan condemns the scheme. The apparatus needed by the motor runner would have to be duplicated on each car, and each car platform would be filled with cranks and handles. Each car would have an air pump for the brakes, and altogether the scheme of no-motor-car and all-cars-alike is not practicable and is not necessary, as there is no more delay at terminals now with the steam locomotive than is absolutely needed to empty trains and fill them again, and there is no more money loss involved in "relaying." An essential principle to follow in railroad work is concentration of machinery to reduce delays due to failures and to decrease cost of repairs.

The all-cars-alike plan is directly in opposition to this principle. The plan, followed on the Intramural road of the World's Fair, of using the motor car as a passenger car, has all the practical advantages of the no-motor-car plan and none of its defects. A loaded motor car would weigh about 40 tons when filled with passengers, and all of this weight would be available for adhesion; hence there would be much greater hauling power than with the present steam locomotives, which have but 20 tons on drivers.

Regarding the strains on the structure that would be produced by the electric locomotive built for the World's Fair, "Conservative" writes:

"The electric locomotive, as designed, followed by a standard elevated coach, would require a structure 50 per cent. stronger than our last type, as it would not be safe to use it on any continuous line of elevated road with which I am familiar."

We have made the calculations for this, and find that the additional maximum fiber stress is 16 per cent., not 50 per cent. Even if the stress were 50 per cent. greater, the structure would not need to be 50 per cent. heavier, nor would it cost 50 per cent. more, for the reason that the posts and many parts would not need to be much heavier to give 50 per cent. greater carrying capacity. The girders would be the principal parts affected. However, that is somewhat foreign to the question, which is, Can the electric locomotive made for the World's Fair be safely carried on any existing line of elevated road? The facts are somewhat as follows: The existing structures are strained by regular heavy traffic from 12,000 lbs. per square inch maximum fiber stress to less than 8,000 lbs. The greatest stress being that on the older sections of the New York structure, and the least that on the Chicago structures. Surely 16 per cent. greater stress than the lowest of these is well within the limits of safety, and from our calculations it appears that there are several structures on which it is safe to run the electric locomotive in question.

#### Cotton Movement of the Last Crop Year.

A report of the cotton crop of 1892, and its movement during the year ending with August last, is presented by the *Commercial and Financial Chronicle* of Sept. 9, with its usual elaborate and trustworthy statistics. The crop of 1892 was the smallest for six years, partly because of reduced acreage, but chiefly because of an unfavorable season. The total production in millions of pounds has been:

1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
3,179	3,166	3,406	3,437	3,629	4,326	4,508	3,358

Thus the last crop was 25 per cent. less than the previous one, and 22½ per cent. less than that of 1890. The effect on the carriers was important. Cotton is not a heavy crop, and the weight of the entire production of the country last year was not as great as the weight of the wheat which the Dakotas alone have produced

some years, and not one-fifth of the weight of many single crops of corn in Illinois and Iowa; but nearly every bale of cotton produced is carried by rail or steamboat some distance, and most of it great distances. Moreover, large sections of the South are prosperous, or the reverse, as the cotton crop is profitable, so that a vast amount of other traffic and travel depends on this crop. It is not, however, relatively so important as formerly in the South, or the cotton states themselves, because there has been a growth of other industries.

What the *Chronicle* calls the "overland" movement of cotton—that is, shipments from interior southern points by rail (or river) to Northern markets, in distinction from that shipped to Southern seaports first, whatever its ultimate destination—has decreased more in proportion than the production, falling from 1,800,482 bales in 1891-92 to 1,290,512 last year, a decrease of 28 per cent. This is perhaps because the decrease of production was more in those districts which can most conveniently ship direct to Northern markets. Texas produced not very much less in 1892 than in 1891, and Galveston's exports fell off but 26,000 bales (three per cent.), while those of New Orleans decreased no less than 824,000 bales (38 per cent.). The receipts at the South Atlantic ports fell off heavily also, especially at Norfolk and the adjacent ports (42 per cent.), and at Charleston (38 per cent.). Savannah suffering much less.

The consumption at Southern mills has been greater than ever before. It is still a small part of the crop, but it is notable that it should have increased in the face of so large a decrease in the crop. These mills consumed seven per cent. of the total production in 1890-91; 7.5 per cent. in 1891-92, and 10.9 per cent. last year. Five years ago, of the total American consumption just 20 per cent. was in Southern and 80 per cent. Northern mills; last year, 27.4 per cent. was in Southern and 72.6 in Northern mills. It must not be supposed, however, that the manufacturers are important—that they employ capital and labor and produce value—in proportion to the weight of cotton consumed. The Southern mills produce chiefly heavy fabrics, of low value in proportion to weight.

The great interior cotton markets are now Houston, Memphis, St. Louis, Cincinnati, Augusta, Montgomery, Atlanta, Selma and Shreveport. These are the markets which year before last—the year of largest production—received more than 160,000 bales. Last year Houston received more than any three other interior markets, and more than Galveston itself, which, of course, is partly supplied from Houston. One-sixth of the whole crop of the United States and probably one-half of the crop of Texas went to Houston for a market. It will probably surprise most of our readers to learn that Houston last year handled nearly two-thirds as much cotton as New Orleans itself. Last year, however, was very unfavorable for New Orleans and one of the best years for Houston.

This country maintains well its position as the chief producer of cotton for the world. The stimulus of enormous prices developed pretty well the capacity of other countries during our war, and in the first six years afterward, while we produced an average of 3,167,000 bales (of 400 lbs.) per year, all other countries produced an average of 2,337,000 bales, and in one year as much as 3,036,000. This latter was more than has been produced in any year since outside of the United States. The average fell off for a time, but recovered again, and for the last three years it has been 2,483,000 bales, while our crop averaged 12,164,000. Thus substantially the whole of the world's increase in consumption has to be supplied from this country, and this increase has been steady and quite rapid, amounting to 70 per cent. since 1878, and to 26 per cent. since 1885. As the territory on which cotton can be grown is limited—there being no "boundless west" cotton country—if this increase continues, the cotton planters seem likely to have, in course of time, more occasion to expand than to restrict their operations.

#### Better or Poorer Freight Conductors?

Where the block system is not used, fuses are a valuable means of protecting trains from rear collisions. This fact is doubtless increasingly appreciated, even by those who are slow to adopt fuses because they are costly. When a fuse is really needed it is dirt cheap, even though it does cost thirty-six times as much as a torpedo; and we can well believe, what we recently heard, that a brakeman using two dozen fuses in one day was not censured for extravagance. We can believe it, we mean, if the circumstances were such that the brakeman could not assure himself, by the aid of his other means of protection, that the next following train would keep a respectful distance in the rear. The aggregate cost of fuses for a year is, however, a considerable item, and it is important that they be used

in the most effective manner; we are glad, therefore, to print the following letter from "Langdon," a correspondent who has written on this subject before. He says:

Colonel Haines, in his paper on railroad accidents recently printed in your journal, states that the engineer, usually the first man to realize impending danger, or to know when an unusual stop is to be made, is the man who should throw off the fusee. There are strong reasons why he should not have this responsibility placed upon him. A flagman and a conductor are on the rear of the train to protect that end of it, and the engineer's responsibility in that direction should cease when he has whistled his flag back. It frequently happens that an engineman gets a "short flag," and at such a time he is all of a sudden busy with the air-brake, whistle, reverse lever, throttle and sand trying to make a successful emergency stop; the time he would consume under such circumstance in getting a fusee from his box, igniting and throwing it from the engine, might be expensive. If he were hauling a train of 50 or 60 cars, it would often happen that the train would be brought to a standstill before the caboose had passed the fusee, and a vigilant flagman would be half a train length, or more, in the rear. If the fusee is thrown from the caboose it always has the advantage of being just the length of the train farther to the rear than if thrown from the engine. The responsibility for rear protection certainly devolves upon the conductor and the flagman. Leave it where it is somebody's business.

Langdon speaks from the trainman's standpoint, it will be remembered. His main point is a strong one, however, regardless of his standpoint, and most superintendents will, we think, agree with him. In fact, Colonel Haines' view involves a radical change in the theory of train running, and we do not know of more than one other manager who has expressed himself so decidedly in that direction. The recommendation to have the engineman attend to the fusee was based on the fact, or assumption, that he is the only man on the train who can be trusted to perform such an important duty. The brakeman is an untrained person, we pay him less than we pay enginemen, and therefore cannot expect so high a grade of man; the conductor is only a trifle better, and therefore we have a very poor dependence unless we resort to the engineman. Possibly Colonel Haines' language was not quite so strong as this, but we have heard managers talk in this way. They seem to think, after a rear collision or two, that all brakemen are incorrigible blockheads, and their ignorance beyond remedy.

But what will be the result if we give up trying to improve the brakeman and conductor and place the responsibility principally upon the engineman? Langdon's practical point, the inefficiency of the engineman as a protector of a caboose 1,500 to 2,000 ft. back of him, may not be serious on some roads, and Colonel Haines doubtless has evidence of satisfactory results from his rule on his own roads; there must be cases where it works to advantage; but the general principle of magnifying the engineman's office and minimizing the others is the important point. We certainly cannot think of relieving the conductor of all responsibility for the safety of his train, and therefore we naturally desire to stimulate his sense of responsibility; but to do this we should be cautious about doing anything which will show him that we distrust his ability. Again, we want passenger conductors who have had a good practical training; and where can they be found unless we try to keep a good force of intelligent men in the freight service? It is true that there are many good passenger conductors who never worked much, if any, on a freight train, but the tendency to make all the promotions to the passenger service from among men who have worked on freight trains seems to be as strong as ever, and we think may be said to be growing. This same argument applies in the matter of the brakeman. We want intelligent brakemen to promote to the ranks of freight conductors.

There are immediate practical difficulties with any scheme for getting along with a dull brakeman. When a train breaks in two the rear brakeman not only loses the counsel or advice which he might get from the engineer, but he may lose the company of the conductor also; but then is just one of the times when the duty of flagging is specially important. As most railroads are now run the need of protecting the train often arises at times when the engineman is busy at a station. For him to throw off a fusee a mile back or to notify the brakeman before reaching the station, and expect him to maintain adequate protection throughout the time while the train does its work, would hardly answer, and in practice the rule would work with much friction at best.

It is generally acknowledged that enginemen's duties have been increased during the past few years, and there is a feeling in some quarters that there is danger of increasing them to an unreasonable extent. Every month we have records of accidents in consequence of disobedience of regulations which both the engineman and conductor have been charged to bear in mind and to observe. On general principles it looks as though we ought to have better men at the rear end of trains, rather than poorer. If we are to

continue the principle of requiring joint responsibility of two men for the safety of a train the true course is to improve both men to the fullest extent possible.

#### The Prevention of Strikes.

The question of the prevention of railroad strikes is brought up in a letter printed in this issue. At first thought this may not be regarded as a timely topic, as most railroad employees are just now very glad to keep their places on any terms, and the only ones who threaten to strike are those who have some sort of time-notice agreement with their employer and who cannot resist the temptation to use their novel power. But the problem of strikes is not a question of a day; it is peculiarly one which can be successfully met only by a well-adapted policy long continued, and a time when there is the least likelihood of a strike is therefore the very best time to discuss the matter.

We are glad again to call attention to Mr. Meddaugh's paper, for it is an able piece of constructive discussion. He states the conditions with singular force, and he proposes remedies which may not be possible now, but which have the great merit of being directly on the line on which our institutions have developed so far.

While there are difficulties in the way of making contracts with employees which shall effectually deter them from striking, no other practicable remedy is in sight, and contracts may not be so hard to accomplish as some railroad managers suppose. Even now we see the working of the contract system, to a limited degree, in the slowness with which numerous railroads are reducing the pay of their Brotherhood men. Instead of issuing a peremptory order the men are invited to a conference. This shows a confidence in them which formerly did not even exist, in many cases, and did not appear in any. One president found that he could not reduce the pay of his trainmen in the present stress without giving them a time notice and he at once announced that he would not reduce the pay of other classes without giving an equal notice.

Contracts with individual employees are feasible if a railroad company cares enough for them to impose the necessary burdens upon itself. It may turn out that it is easier to find men who will give a valid \$200 or \$500 bond not to leave without a sixty-day notice than to find managers who are willing to submit to the reciprocal restriction concerning the discharge of men. And yet, what harm is there in such restrictions? An agreement of that kind would probably tend to improve discipline. It would make every superintendent careful in his selection of men, and on many roads this alone would be a valuable change. There certainly is no use in trying to compel, by means of legislation, the assumption of additional burdens by employees unless the employer will agree to such conditions as a competent arbitrator would be likely to impose; and the obviously best way to try the scheme for binding employees is, therefore, for companies to make the experiment voluntarily without waiting for legislatures to act.

An important part of Mr. Meddaugh's paper is that in which he argues in favor of the right of Congress to enact such laws as were enforced in the Ann Arbor cases last March. Although he may underrate the value of the present national law, the public has reason to be well satisfied with the vindication of principle that was effected by Judge Ricks' decision. He punished the engineman who was guilty of malfeasance in his office as agent of a common carrier, and yet did not interfere with the employee's right to quit. His decision was in language which received general approval. It is true that the clause of the Interstate Commerce law touching this point is brief, but its terms are positive. It may not be possible to adequately punish every engineman who undertakes to decide for himself what cars he will haul and what he will not, but the moral effect of a law which aims to do this may have considerable effect. This law certainly did its part in the Ann Arbor case, and the other part of the duty of that hour, that of pinning down the employees so that they will not resign just before the sheriff nabs them, rested upon the railroad companies.

There is one other feature of the strike problem in which some railroads should remember that they call upon the law to do more than its share in preventing trouble, and that is in cases where strikers or other mischief makers interfere with the movement of cars and engines in yards. It is a fundamental duty of a railroad, as of any other property owner, to protect its premises by adequate fences or other barriers, so that the police can keep out intruders with a reasonable force. A large yard, partly in the street, and all easy of access from the street, offers the most inviting field imaginable for the semi-criminal classes, who can make endless trouble, and yet who nearly always stop short of an actual crime of violence.

#### Track Brakes.

In connection with the subject of greater safety for high speed trains, frequent propositions have been made recently that track brakes, those having shoes sliding on the rails, would finally become a necessity. One electric company has proposed this type of brake for high speed trains on an electric road, and a plan has been devised for applying it with compressed air. At first sight a track brake seems a very efficient device, but it is really less efficient than a wheel brake and besides is a source of danger.

Within the limits of actual service the friction between the shoe and the brake, or the shoe and wheel, which furnishes the retarding force, is dependent solely upon the pressure that can be brought to force the shoe against the wheel or rail. Friction is also a function of the pressure and velocity between the parts rubbing together, and it diminishes as the speed increases. It requires a considerable greater force to start a thing to sliding than to keep up the motion after it is started, or in general terms the coefficient of friction of a thing at rest is much greater than when it is in motion.

The bottom of a gear wheel and the point of the rail upon which it stands are at rest with respect to each other for the instant that the wheel passes over the point and therefore the coefficient of friction or holding power of the wheel on the rail is much greater than if the wheel or brakeshoe were sliding on the rail. This being the case a load of 90,000 lbs., upon the wheels of a car with a coefficient of friction of 0.25 will give a retarding force of 22,500 lbs.; while for a track brake sliding upon the rail at a velocity of 40 miles an hour, with a coefficient of friction of 0.12, the holding power would be only 10,800 lbs. To resist the retarding force of the wheels when rolling upon the rails, the shoes must afford an equal resistance upon the tires of the wheels, namely, 22,500 lbs., but the coefficient of friction between the wheels and shoes is much less than that between the wheel and rails, because it is the friction between two sliding surfaces. Therefore the pressure must be greatly increased to secure a holding power equal to that of the wheel on the rail.

The track brake has the same decrease of friction for a given speed as the wheel brake, for it is moving over the rail with the same velocity that the wheel brakeshoe is moving over the surface of the wheel. Therefore it is evident that a track brakeshoe cannot have the retarding force to stop a train that a rolling wheel would have.

The force that may be applied between the shoe and wheel is limited only by the strength of the truck and its connections to the car, while the limit of pressure that can possibly be applied to all the track brakeshoes of a car is its total weight. The principle of the re-inforced brake, now being developed, is based upon the foregoing laws of friction. This brake embodies the idea of applying great pressure to the wheels at high speeds. At slow speeds it is found practical to apply only 90 per cent. of the weight of the car to the wheel brakeshoe, for more would slide the wheels. The re-inforced brake contemplates the use of a pressure at 70 miles an hour, equal to about  $2\frac{1}{2}$  times the weight of the car, this pressure to be gradually reduced as the speed decreases. In this way the retarding force of the brakeshoes on the wheel will be at no time greater than the adhesion of the wheels to the rails and therefore the wheels will not slide upon the rails. If they should begin to slide the coefficient of friction immediately becomes much less between the wheels and rail, and therefore the retarding force would be greatly diminished. The need of a re-inforced brake has been set forth in the *Railroad Gazette* (Dec. 16, 1892, and Aug. 25, 1893).

But besides the fact that a track brake cannot have the retarding force of a wheel brake there are other considerations which must not be overlooked. In the first place its location must necessarily make it a dangerous attachment to a car. It must be placed where it is most liable to damage in a derailment and thus become inoperative when most needed to save the train and the lives of passengers. Bearing, as it does, upon the rail it must come in contact with ties, rocks and obstructions if the train should leave the track; and the hard usage that it would have to withstand would be greater than any brake yet constructed could be expected to endure. It is also in a very dangerous position in front of the wheels in case any of its supports give way. If a bad frog or crossing or defective rail should break it from its fastenings disaster would be certain to follow. All who are connected with railroad operations know too well the damage that sometimes results from a fallen brakebeam to make it necessary to explain its element of danger.

Still another element of danger arises when the weight of the car is taken from the trucks and transmitted to the track brake. The safe limit of pressure between track brake and rail would be much less than the total weight of the car, because the trucks require considerable load to prevent them from climbing the rail, and it is estimated that 50 per cent. of such total weight is as much as could be safely transferred from the trucks to the brakeshoes. If this estimate be a fair one it would reduce the retarding force of a track brake from 10,800 lbs. to 5,400 lbs., as against 22,500 lbs. for the wheel brakes or something less than one-quarter of the braking power of the wheel brake.

Taking all these facts together it is quite clear that

a track brake has little to recommend it for high speeds. It has so many elements of danger that it will probably never be used except as an auxiliary brake and then only after its dangerous features have been eliminated. For emergency stops it cannot possibly become a competitor of the wheel brake.

The annual report of the Denver & Rio Grande, just issued, of course covers the year ending June 30 last. Since July 1 the company has been passing through a period of great decline in gross earnings, the loss in gross for July being about 40 per cent. and for August about 50 per cent. under the corresponding receipts of last year. Interest in this company centers, therefore, in its future, but the report shows that the treasury is in a good condition to meet reverses. The earnings for the year were the largest in the road's history, and the surplus earned above fixed charges was \$1,642,000, the latter sum being the larger proportion of 40 per cent. of the total net earnings. The company paid two quarterly dividends of one per cent. each, but very wisely passed the July disbursement, applying all surplus to extinguishing the floating debt, of which, very fortunately, it now has practically none. Estimating the future from the past the company could lose 40 per cent. of its net earnings before bond interest would be imperiled. All the officers voluntarily reduced their salaries from 10 to 20 per cent. The Denver & Rio Grande lines are almost entirely in Colorado. That state produces a large proportion of all the silver mined in the United States, hence the fall in price and the uncertain future of that metal has stopped much of the mining. Not only so, but the industries of Colorado, outside of silver, have been as much depressed as those of other Western states, making total business loss of large dimensions. As to the future of silver there is reason to believe that there will always be a legitimate demand for it which the important and cheaply worked mines of Colorado will be able to supply at a profit, and hence it is thought that the stoppage will be temporary, pending a readjustment of price and cost of silver. All Western states are dependent for their business primarily upon credit, and as a revival of credit seems now probable, business in Colorado will no doubt revive. In short, although the Denver & Rio Grande has been hit exceptionally hard, and may for a while longer find continued declines in traffic as compared with a year ago, yet it would be an error to assume that the roads in that state will not slowly but gradually increase their volume of business from the lowest point, as confidence returns and silver mining and trading again become profitable.

The principal educational institutions of the country are utilizing their exhibits prepared for the World's Fair by introducing them into their catalogues and announcements for the coming year. Photographs of buildings, laboratories and lecture-rooms, plans of grounds and buildings, charts and tables showing growth, numbers, resources and facilities of the schools are published in book form; thus preserving data and records that have cost much to compile and prepare. These publications will do much toward reviving and renewing the memories of older graduates, and to inform them, as well as the public, of the growth, condition and wealth of their Alma Mater. The scheme is a wise one in that it presents to the public an interesting and telling advertisement of the school. Almost every university or college in the country has enjoyed several years of uninterrupted prosperity, and they all can present to the public a very flattering statement of their growth and increased facilities for instruction. Harvard, the University of Michigan, Yale, Cornell, Princeton and the Massachusetts Institute of Technology cannot alone boast of greatly increased attendance and larger resources and facilities; almost without exception the smaller colleges have enjoyed an unparalleled period of prosperity. The publication of interesting historical and descriptive matter, together with what is usually announced in the catalogue, makes university catalogues of '93 and '94 of particular value. All offer excellent facilities for instruction and living; and since nearly all the larger institutions have pursued the same policy of presenting these statistics to the public one cannot be said to have gained any decided advantage over another by what has been done. Among the catalogues recently received are several from the professional schools of Harvard University, the medical school, law school, veterinary school and scientific school having issued illustrated pamphlets showing what they have to offer in the way of buildings and apparatus necessary to instruct in their respective branches. Yale issued during the summer a catalogue illustrating her numerous departments after much the same manner, and we have just received from the Massachusetts Institute of Technology a pamphlet illustrating her laboratories and lecture-rooms employed for instruction.

The new Russian grain tariff, which went into effect Aug. 1, and is not to be changed for three years, except in a few particulars, makes the following rates per car-load for shipments to all Russian ports and the German port of Königsberg, and to stations on the western borders—that is, substantially, to all exporting stations, for 180 versts or less, 25 kopeks per car-load; for distances above 180 versts, up to 980, 9 kopeks per verst to

be added to the charge for 180 versts; for greater distances, 5 kopeks per verst for the distance in excess of 980 versts. Translating this into our measures, and taking the depreciated rouble, which varies somewhat in value, at 50 cents, which is near its recent value, we have a charge of 18½ cents per mile per car-load of 22,000 lbs. for the first 120 miles; 6½ cents per mile any further distance up to 614 miles, and 3½ cents per mile for any further distance. Applying these figures for the 960 miles on which our Chicago rates are based would give for the car-load of 22,000 lbs. (18½ cents × 120) + (6½ cents + 494) × (3½ cents × 316) = \$68.82 = 31.3 cents per 100 lbs. For the 120 miles the rate is 10.2 cents per 100 lbs., and at that rate for shorter distances; but this rate, it must be remembered, affects only shipments from stations within 120 miles of an exporting point. For the distance from Kansas City to Omaha to Chicago (if Chicago were an exporting point) the rate would be 21.6 cents per 100 lbs. For internal traffic, however, the rates are not higher, but lower, the charge for the first 320 versts (214 miles) being 18 kopeks per verst (13½ cents per mile) per carload of 22,000 lbs. For distances greater than 320 versts the internal are the same as the export rates. A rebate of 10 per cent. will be paid on the freight of flour exported from internal mills, and of 7½ per cent. on flour coming from exporting points—which latter will almost never be from imported grain, but from grain which has already paid freight from an interior point. There are some exceptional "yearly rates" which apply to 25 points, chiefly on shipments to Odessa and to two German Baltic ports.

News of retrenchment on railroads has nearly ceased, the principal items during the past week having been those telling of employees who made loud threats that they would strike if their pay should be reduced. These items appear to be mostly froth; and the talk of threatened strikes by the employees of the Rock Island, the St. Paul and other Chicago roads is pronounced false by the managers of the lines. They also deny that they have given notice of a reduction in wages. Manager St. John, of the Rock Island, denies that any conference was held with any representatives of his employees. The Denver & Rio Grande has had tedious negotiations with each of the brotherhoods whose members work on its road. It is said that the prospects of agreement are not good, but the position of the road is such that the officers will probably enforce whatever reduction is demanded by the falling off in business, and then let the men leave if they see fit to do so. This seems to be the tenor of interviews with officers. The Directors of this road at a meeting in New York last week unanimously passed a resolution that

"the action of the general officers of this company in voluntarily proposing a reduction of their salaries in view of the present condition of the business of the company in Colorado is gratefully accepted by this Board as the best evidence of the faithfulness and zeal of these officers, and it confidently hopes that, with the help of such officers, this company will soon be in condition to decline longer to accept such sacrifices on their part."

The Chicago, Milwaukee & St. Paul has taken back about 50 of the men who were discharged from the Milwaukee shops. The Philadelphia & Reading and the Lehigh Valley have increased the working time at their large shops to six days, of nine hours each, per week. The fall time table of the Pennsylvania road, which went into effect last Sunday, shows that 21 trains to or from Philadelphia and 18 to or from Pittsburgh have been taken off. All of these trains made short trips. The suburban business at Pittsburgh has been reduced considerably by the competition of electric street lines.

#### TRADE CATALOGUES.

*Testing Machines, Screw Jacks, Railroad and Machine Trucks.* Riché Brothers, 413 Market Street, Philadelphia.

This issue is designated as Catalogue No. 3, and is 11½ × 9½ in. in size. It comprises Volumes I. and II., bound together. It is made in the best manner and is in a very ornamental cover, designed by George S. Harris & Sons, of Philadelphia. Part I. contains 96 pages and gives illustrations and descriptions of the company's United States standard testing machinery and appliances, of its patented frictionless ball-bearing screw jacks, and of improved marble molding and countersinking machines. These are prefaced with a long list of names and addresses of parties who are using these machines and appliances.

Part II. contains 50 pages and is devoted to a large assortment of trucks and barrows for handling almost every kind and class of goods. Railroads, warehousemen and contractors will find illustrated every facility for handling freight and materials.

#### English Railroad Notes.

It is a complaint of some of the English railroad men that an American, landing in England and carefully guarding his footsteps lest he fall over the edge and be drowned, labors under the impression that the country is so small as to be unable to afford room for more than one line of railway between Liverpool and London. Hence he proceeds to Lime street on arrival at Liverpool, takes the hotel there, takes a 9 p. m. special to London, and goes on to Paris next morning. For some time the Midland people have been endeavoring to upset this arrangement so as to induce American travelers to leave Liverpool by their line from the Central Station

and travel by the more picturesque Midland line to London, and they are now securing quite a large share of this traffic, running special trains to and from Liverpool to meet the boats. Now that the South-Western Railway has begun to waken up, and Southampton is a port for American traffic, the Liverpool people have begun to dredge away the Mersey bar, which so often causes several hours' delay in entering the river.

The South-Western, however, hardly takes kindly as yet to running fast express trains and thinks it does well to run a boat express from Waterloo at 9:40 a. m. to catch the noon boat for New York from Southampton, 78 miles. But the South-Western is a Southern line and has shockingly bad neighbors. I should suppose there is not throughout America any contrast between one railroad and another so marked as the contrast here. The Southern lines have no first-class cars comparable with the ordinary Midland third-class cars, and when passing from one road to another the difference is felt at once, a change from a Great Western to a Midland train, for example, being most pleasing, in the difference not only in cleanliness of cars, but in the behavior of the officials. And yet the Great Western ought to be a favorite line. It has the easiest roadbed with continuous rail support, on straight and level line and good scenery, but the management seems hopelessly out of touch with their customers, and I find commercial men only use the line out of compulsion where it has a monopoly, as it has over a wide area.

The rates question is still much to the front, and railroad men have been doing considerable fencing before a committee of inquiry. They talk very cleverly about having to charge rates so as to pay a dividend, but they do not seem to like being pressed to explain how it is they will carry foreign produce for 200 miles for less than they profess to be able to carry English produce for 20 miles. I do not mean merely a less ton-mile rate, but an absolutely less through rate, the English farmer loading and unloading at each end. Mr. Acworth wisely avoids this question when he writes to the *Railroad Gazette* in defense of the roads.

The electric line, City & South London, advertise their line as the coldest place in London, and they are right. To-day, Aug. 16, has been the hottest day of the year. Taking the electric from Monument to the Oval, I found it quite chilly, and the relief from the heat above more than counterbalanced any vitiation in the atmosphere of the tunnels. Possibly to-day's experience is too favorable for the line, but it seemed as though there was a decided improvement in the ventilation, as compared with the condition a few months ago.

The steam underground (District, etc.) is now in a fearful condition, hardly life-supporting, indeed, so sulphurous is the atmosphere.

The chairman of this line, who is also chairman of the Chatham & Dover and other unsuccessful undertakings, nearly cried about things at a recent meeting. His early engineering experience was upon a canal where broad, flat-ended barges are towed slowly along by a horse which nibbles occasionally as it creeps along and often a picturesquely attired female sits half emergent from the little cabin and steers. I knew this canal well as a boy and have had many a golden carp out of it, and I never travel by the Chatham & Dover or the Underground without noting how powerful is the influence of early training. The cars are modeled on the pattern of the barge cabin, the speed is kept as closely down to that of the slow-towed barge as it can be, and though the picturesque element may be wanting, the steering of the railroad, like the barge, has the same elderly female element in it, and the same phlegmatic Dutch spirit animates the lot.

I wonder constantly why Americans continue to use the Southern routes to the Continent when crossing from England. The routes via Harwich to Hamburg, Rotterdam, Antwerp or the Hook of Holland—this last a new route—are better in every way. The Great Eastern Boat Express leaves Liverpool station at 8 p. m., and passengers are run alongside at Parkstone Quay, are on board before 10 p. m. dine or sup before the rough water is reached, turn in and are across in still water again before it is time to rise in the morning. By these routes Holland and Belgium are less liable to be omitted from a continental tour. This reminds me that the list of large passenger stations recently published in the *Railroad Gazette* did not include Amsterdam, where a single span roof of large width, and, I believe, 300 meters in length, has existed for some years. Holland has so much of interest to engineers that it should not be overlooked, and the Great Eastern are waking up. They are spending three or four million dollars in doubling their London terminus and widening the first few miles of their road to accommodate their growing traffic. They carry more passengers annually than any other of the big companies in Britain, although they only own about 900 engines.

Their worst fault is that they sacrifice their stock in order to economize on track, spending on repairs what would be better spent on ballast. They do not run through a good country for cheap ballast, it is very true, but they certainly are not saving every penny they refuse to spend on ballast. I expect the accounts for repairs of springs, etc., would show where a portion of the saving goes.

LONDON, Aug. 16.

#### The Road Masters' Convention.

The eleventh annual meeting of the Roadmasters Association of America met at Metcalf's Hall, Chicago, on Sept. 12, President H. W. Reed in the chair. After the election to membership of candidates recommended by the executive committee, a communication was read inviting the association to attend "Railway Day" services on Sept. 16, at the World's Fair grounds, and it was unanimously voted to accept it. Mayor Harrison was then introduced and made a short address of welcome to which President Reed replied. Mayor Harrison was then elected an honorary member of the association. Correspondence between President Reed and officials of the American Railway Association and the American Society of Railroad Superintendents was then read. President Haines, of the first named association, offered no suggestions as to subjects for discussion as requested, preferring to leave that matter entirely in the hands of the roadmasters. Secretary Hammond, of the American Society of Railroad Superintendents, suggested a conference of the executive committees of the various organizations of railroad officers. In reply to an invitation to deliver an address before the association Colonel Haines declined, but expressed hopes of meeting the association for a few moments. Mayor Winston, of Minneapolis, also signified by letter his intention of attending some of the meetings of the association. Other letters received were referred to committees.

The report of Secretary W. W. Sharpe showed a balance on hand on June 1 of \$1,140. The secretary asked for instructions as to dropping members three years in arrears as ordered by the last convention. A discussion as to the time for consideration of the report of the committee on the revision of by-laws was settled by an agreement to defer action until just before the election of officers. The meeting adjourned at 12 o'clock and met again at 2 o'clock for the discussion of papers.

#### Foreign Railroad Notes.

Four steam street locomotives were recently sent to Japan from Switzerland, having been built by the Swiss Locomotive & Machine Works, of Winterthur.

The official report shows that at the beginning of this year there were 9,758 miles of railroad completed in Austria, an increase during 1892 of 55 miles. About one-half of the total mileage was worked by the state.

The locomotives of the London & Northwestern burn 27,000 tons of coal a week, those of the Midland about 25,000 tons, the Great Northern about 12,000, and the Great Eastern about 10,000. This means that the coal burned by these four companies alone is 263 lbs. per second.

The Hungarian State Railroad management has contracted with a clothing house to supply a stock of trousers and blouses of strong blue linen, which are to be kept on hand for sale on commission to employees at the various stations at the very moderate prices of 57 cents for a pair of trousers and 66 cents for a blouse. The men can give orders against their pay for the clothes.

A paper concerning two local lines of narrow-gauge railroad in the province of Styria, Austria, appears in the *Zeitschrift of the Austrian Engineers' and Architects' Society* of Aug. 18, 1893. The lines are respectively 7½ and 9½ miles long, and were opened for traffic in December of last year. The paper gives details of the construction, equipment, manner of operation and other features.

The latest mountain railroad is up the Schasberg, a few miles from Passau, at the junction of the Inn and the Danube. This road, of the Abt system, in a length of 3½ miles overcomes an elevation of a little more than 4,000 ft. The view over the Bavarian forest and the Austrian Alps and the lakes among them is said to be enchanting. The ascent is made in 63 minutes. One car, seating 50, makes a train, and the road opened with 14 trains daily.

Some of the mountain railroads in Switzerland find it advantageous to open long before the snow melts on their upper parts, and to do this an enormous amount of snow has to be shoveled away. Last May, when the road from Glion, on Lake Geneva, up to Rocher de Naye was opened, the cars ran for some distance between walls of solid compressed snow 12 to 20 ft. high. When the work began one of the upper stations had disappeared, and it was supposed that it had been swept away by the winter storms, which are not always zephyrs. A rounded elevation was recognized as the site of a water tank, and from this the position of the station was determined and excavations were begun. After digging down 6 ft. the shovels struck not the foundation, but the roof of the station, which was in its place intact.

In the whole German Empire on May 1 last there were 27,540 miles of railroad, of which 8,408 had a double track, 25 miles three tracks and 30 miles four tracks. The length of narrow-gauge lines was 788 miles. The increase since April 1, 1892 (13 months), had been 437 miles, 32 miles of it narrow gauge. Of the whole mileage only 2,894 miles (10½ per cent.) was worked by

companies, though 205 miles more, worked by governments, was owned by them. Besides the above, open to public traffic, there are 1,294 miles of railroad in the Empire in mines, factories, yards, etc., not serving as common carriers, and of this 308 miles is narrow gauge.

At a meeting of the Railroad Society in Berlin some time ago, Professor Göring discussed the cost of maintenance of track with iron cross-ties. He claimed that it was certainly settled that a good serviceable track was possible on iron ties. In Germany there are over 7,000 miles of such track. As to its durability, cost, etc., Professor Göring thought that, taking everything into consideration, cost of maintenance was but little higher, and in some cases might be lower, with iron than with wood. The larger part of the wooden ties in Germany must be imported, chiefly from Russia, and the use of iron gives employment to national industries. He thought the Prussian State Railroads should make a new and thorough investigation of the subject, and especially establish whether it is true, as has been claimed, that iron ties cost more for maintenance.

The Prussian State Railroads in the year ending with March, 1892, had a passenger traffic equivalent to the movement of 441 passengers each way daily over the whole system, which may be compared with the similar movement of 104 passengers on the American railroads in 1890. The movement on the Alsace-Lorraine railroads (owned and worked by the Empire) was 333, on the Bavarian State Railroads 252, on the Saxon State Railroads 435, on the Württemberg State Railroads 308 passengers each way daily. The average passenger train-load was largest in Saxony (63.9) and Prussia (62.4); it was 48 in Alsace-Lorraine, 42.2 in Baden, 46.7 in Württemberg and 48.4 in Baden. Here in 1890 it was only 41—less than a full car load. The average mileage of passenger cars during the year was greatest in Prussia (20,807 miles) and least in Bavaria (21,242), and the average in for all of the systems of state railroads named above was 20,010 miles.

The statistics of the German Railroad Union for 1890 and 1891 show that at the close of the latter year the principal German railroads had 33,116 miles of track with wooden cross-ties, 200 miles with stone-block sleepers, and 11,610 miles with iron sleepers. Of the latter, 7,826 miles of track was on iron cross-ties, and during 1891 this system increased 629 miles, while there was a decrease of track with longitudinal iron sleepers. The increase in track on wooden ties was 510 miles, or considerably less than the additions with iron ties. The increase was 5.6 per cent. in iron and 1.6 in wooden ties. Nearly all the track is of T, or what the Germans call "broad-based," rails; there are but 430 miles of track of rails laid in chairs. A German commentator on these figures says that iron ties, when laid on a good roadbed and in suitable ballast, have answered all requirements, and, when the ties themselves have been long enough, have been as heavy as from 128 to 165 lbs. each, and have had proper connections. Sand ballast has not answered.

There is a European "Time Convention," very much like ours, originating among the German and Austro-Hungarian railroads, and extending as the connections of trains with adjacent countries became more important. England, owing to its isolation, might be supposed to have little interest in Continental time tables, but a few of its railroads have a very important foreign travel, much more over French and Belgian than German connections, however. These conventions (half yearly) have generally been held in Germany and Austria, but the last one, beginning June 7, at the invitation of the three English companies most concerned, was held in London, where the Continental delegates, some 150 in number, were treated with royal hospitality. Every delegate, before starting, was provided with a free pass, good for the whole month of June, which entitled him to travel on all the steamer lines connecting with the English Continental trains, and on all the railroads belonging to the Clearing-House—that is, on pretty nearly all the lines in the Kingdom, including the under-ground and other city railroads in London. Magnificent banquets were given in various places, and excursions made which brought before their eyes the enormous traffic in London, by vessel as well as by rail, and the appliances for handling it. Among these was an excursion to the great gas works at Becton, which convert over a million tons of coal yearly, and supply more than three-fourths of London. An idea of the extent of these works may be formed from the fact that the railroad tracks for handling coal, etc., in the works have an extent of 30 miles. A number of French railroads were represented at the conference, and these expressed the wish that the next summer conference be held in Paris. Among the longer excursions made was one to Edinburgh in a special train provided by Thomas Cook & Son, the tourist agents, who have enormous dealings with the Continental railroads.

#### TECHNICAL.

##### Manufacturing and Business.

Rood & Brown's Car Wheel Works at Buffalo, which have been running on about half time for several months, will go on full time within a week.

The Akron Tool Co., of Akron, O., has received from the Cincinnati, New Orleans & Texas Pacific an order for 30 McNeil patent balanced automatic dump charg-

ing barrows of one ton capacity, for the coaling stations on that line. One firm writes to the Akron Tool Co. that an engine can be furnished four tons of coal in three minutes with the McNeil barrows, counting from the time engine is stopped until apron is returned to its proper position.

William H. Pratt was this week appointed Receiver of the Mt. Vernon Bridge Co., of Mt. Vernon, O., on the petition of Frederick Gwinne, Jr., of Pittsburgh, one of the stockholders. The assets of the company are reported as \$150,000, and liabilities less than \$80,000. There is a large amount due which it is unable to collect. It is doing a good business, and will not shut down its works. Mr. Pratt has been superintendent and general manager for some years.

##### Interlocking Signals in Illinois.

The Illinois Railroad and Warehouse Commissioners have ordered interlocking to be placed at Mennence at the crossing of the tracks of the Chicago & Eastern Illinois and the Indiana, Illinois & Iowa railroads; also at Watseka at the crossing of the Chicago & Eastern Illinois and the Toledo, Peoria & Western.

**Opening of a New Swiss Mountain Railroad.**  
The Stanserhorn mountain railroad, in Switzerland, was opened on Aug. 17, with appropriate ceremonies. The road is worked by cable without the use of rack rails. It has been built in three sections, having a combined length of 2½ miles, and the difference in altitude of the termini is, for the first section, 900 ft.; for the second, 1,040 ft., and for the third, a little over 2,000 ft. The grades range from 10 to 62 per cent.

##### A Four Story Tunnel.

The Department of Public Works of St. Petersburg, Russia, has under consideration a recently proposed project of tunneling under the River Neva at that city. The tunnel is to be circular in section, about 43 ft. in diameter and a little over 600 ft. long. It is to be practically a four-story structure; the first story is to be given up to telegraph and telephone cables, the second to foot passengers, the third and largest to vehicles of all kinds, except street cars, which last are to be accommodated in the fourth story. The estimated cost of the tunnel is placed at about \$2,500,000.

##### New Records for Ocean Steamships.

The praises of the new ocean liner, the "Lucania," have been proclaimed in shipping circles and through the daily press. This new and magnificent steamship has lowered the *maiden* record by 16 hours, and came within 1½ hours of lowering the record for the westward passage from Queenstown to New York, established by the American Line steamer, the "Paris." The daily runs were 400, 400, 408, 510, 533 and 284 knots, a total of 2,781 nautical miles. The "Paris" on her record trip steamed 2,782 miles. The longest run, of 533 knots, is not equal to the record of 548 knots made by her sister-ship the "Campania," but is 3 knots better than the "Paris's" best run of 530 knots. Great things are expected from the "Lucania" in record breaking. Her coal on this trip is said to have been inferior, owing to the strikes on the Liverpool coal docks, and her machinery may be expected to improve with service. The passage was made in 5 days 15 hrs. 46 min.

The "Campania" is reported as having recently beaten all eastward records, New York to Queenstown, having made the passage in 5 days 14 hrs. 55 min., the best previous run having been made by herself in 5 days 17 hrs. 42 min. The best easterly run by the Paris is 5 days 22 hrs. 50 min.

##### An Experiment in Burning Garbage.

The street cleaning department of the city of Chicago is experimenting with several schemes for burning garbage. One of the latest is a portable device, having the appearance of a portable engine. There is a boiler or furnace covered with asbestos and having a smokestack. At the rear end is a tank for kerosene oil. The furnace is divided into three compartments, the lower one for ashes and the residue from the furnace, the center one for paper and combustible refuse, and the top one for the garbage proper. The fire in the center compartment dries out the wet garbage, and it is dropped into the furnace, where it is consumed. No offensive odor is emitted from the stack. The kerosene oil is used to feed the fire when there is not enough of the combustible garbage. The furnace is hauled about by horses and is followed by a wagon which collects the bottles, broken glass, etc. This is an interesting experiment and one that may lead to a portable garbage crematory that will be found useful in a city like Chicago, where the distances to dumping points are very great.

#### THE SCRAP HEAP.

##### Notes.

At Norristown, Pa., last week 15 men and boys were imprisoned for 15 days for stealing rides on the cars of the Philadelphia & Reading.

A passenger conductor of the Pittsburgh & Western ran 6,340 miles in August, and, according to a Pittsburgh paper, earned \$222.10.

Owing to the general depression in business the Colorado railroads are asking the Board of Equalization to reduce their taxes.

At Bridgton, Me., on Sept. 6, the engine house of the Bridgton & Saco River Railroad was burned up, together with two locomotives. This removes 67 per cent. of the road's entire motive power.

Local papers state that the Cleveland, Cincinnati, Chicago & St. Louis has discharged all of its train collectors. The collectors, to relieve the conductors of the

duty of collecting tickets and fares, have been employed on that road for several years.

A press dispatch of Sept. 8 reports that a large number of passengers were robbed on a sleeping car of the Grand Trunk between Detroit and Suspension Bridge the night before. Only one passenger was awakened and the identity of the robber has not been discovered.

On the Vandalia Line recently it was found that of 400 cars of coal consigned to employees at half rates, since May 1, 240 cars had been turned over to persons who had no right to the reduced rate; and the privilege has therefore been withdrawn from all employees.

The Cleveland & Marietta Railroad tunnel at Kimballton, O., which had been on fire for two weeks, caved in on Sept. 3 about 30 ft. from the north end, the hole reaching to the top of the hill. The company will re-timber the tunnel, and expects to do the job in 30 days.

An express train of the St. Louis & San Francisco was stopped by robbers near Pacific, Mo., on the night of Sept. 5, and a battle ensued, the robbers using dynamite to open the express car. One of them was captured and the rest repulsed.

The Baltimore & Ohio Railroad has been indicted at Ellicott City, Md., for maintaining a nuisance in the shape of a picnic and camp meeting ground for colored people. A jury found the company guilty, though the road claimed that the alleged lawlessness was outside its grounds.

A fire which began in the lumber yards of the Pullman Palace Car Co., in the town of Pullman, Ill., did damage to the extent of \$250,000. The fire spread over 20 acres, and burned over 9,000,000 sq. ft. of lumber. Several of the shops were threatened by the flames, but escaped serious damage.

The Chicago & Alton took into Chicago on "Illinois day" a passenger train of 22 cars, carrying 781 members of the Illinois National Guard. The train was made up of one baggage, one freight, two stock, one sleeping and 17 passenger cars. It is said that it was hauled from Bloomington by one engine.

The Burlington & Missouri River has applied to the Nebraska Railroad Commissioners for relief from the law requiring a connection track to be built at all stations where its road runs near another. The Commissioners have authority to grant exceptions where they deem a connecting track unnecessary, and the Burlington makes this application in respect to 63 stations.

Mr. N. O. Nelson, of St. Louis, proprietor of one of the most noted profit-sharing establishments in the United States, made an address at Chicago last week, in which he stated that his employees were now working on full time for three-quarter pay, in order to conserve the interests of the establishment. This incident will afford railroad men a glimpse of how profit-sharing might work if it were tried on railroads.

##### World's Fair Notes:

The exhibits of all articles of special interest to street railroads have been made the subject of a 40-page directory, which is published by the *Street Railway Gazette*, of Chicago.

There has been sent to the World's Fair, from the Wagner Palace Car Co.'s East Buffalo shop, a model of a sleeping car frame which has been built for the purpose of showing the style of frame used in these cars. The model is 8 ft. long. The feature of this frame is the strengthening of various wooden members, near the ends of the car, by iron plates.

The great Ferris wheel on Midway Plaisance has proved itself a paying investment. When the concession for the wheel was granted Mr. Ferris was permitted to take in \$300,000 before he began paying any percentage to the exposition company. This amount was exceeded by \$3,000 on Sept. 8, and hereafter 50 per cent. of the receipts will be paid to the Exposition Company. The daily average business for the wheel has increased gradually, and on Sept. 8 the receipts were \$8,000.

##### South American Notes.

A new railroad has been authorized to be constructed in the Argentine province of Riojas, extending as far as Padquia. The length of the line will be 180 miles. It will open up a valuable mining region.

The Brazilian Government has made a contract with the Western and Brazilian Telegraph Co. for the laying of cables connecting all the coast cities of the Republic and extending to Uruguay and Argentine.

The Argentine Minister of Finance has established a Bureau of Inspection for the regular investigation of the affairs of all joint stock companies in that republic operating under concessions which accord special privileges or guarantees.

During the year 1892 a total of 198 foreign vessels entered at the port of Rio Grande do Sul, Brazil. Of these 34 were from the United States, carrying cargoes almost exclusively of flour. Sixty-seven were from Great Britain, of which 42 carried cargoes of coal. The clearances were 147 vessels, of which number 63 were in ballast. Only nine cleared for United States ports, all being in ballast.

The project of Chile to sell the government nitrate properties in the province of Tarapacá has taken definite shape in the form of a bill drafted by a committee appointed for this purpose, which it is thought will pass the Chilean congress at its next session with very little modification. There are 62 of these properties in all, having an appraised valuation of \$7,500,000. Thirty-eight have works upon them ready for operating. The terms of sale will be 20 per cent. cash, 30 per cent. at the end of the first year, and the remainder at the end of the second.

The Chilean government has granted concessions for two railroads to be built in the province of Tarapacá, one from Huara to Iquique, and the other from Caleta Buena to Iquique. This action is taken in spite of the

fact that the Nitrate Railways Co., Ltd., held concessions granted by the Peruvian government before the war with Chile, giving it the sole right to construct railroads in that province. The new concessions require that work shall be commenced within 90 days after the approval of the plans, and shall be completed within one year thereafter. The concessionaries are Messrs. Whitelegg, Harold and Vergara.

A comparison of railroad earnings in Brazil and Argentina reveals some interesting features. Both countries have been suffering from over-speculation and bad financing, and both have passed through a panic. In both there has been retrenchment in importation after a period of extravagance, followed in each case by large crops, and an important commencement of manufacturing enterprise. The railroads suffered temporarily by a decrease of freight shipments, which soon recovered, and losses resulted subsequently more from the fluctuation of exchange than from diminution of traffic. In general the Brazilian roads have suffered far more seriously than the Argentine. Taking eleven principal roads in Brazil, all owned by English corporations, having an aggregate of 997 miles of track, the gross receipts for 1892 amounted to about \$6,615,000, or \$127 per mile per week, but the average operating expenses were 123.34 per cent., or nearly a fourth more than the gross income. On the other hand, nine representative Argentine roads, aggregating 4,330 miles, returned \$11,000,000, or \$49 per mile per week, with operating expenses averaging 71.14 per cent. of the gross income.

The Brazilian roads are almost all short lines, not connected into systems, so that they have not proved a stimulus to national growth and diversity of industry. They run in from every coast city in the Republic. These isolated lines serve districts almost entirely agricultural, producing in almost every case only a single important product. The freight offered is limited by this condition. It all comes at once, and then for long periods the road maintains an expensive service in accordance with its contract, with insufficient traffic to pay the costs. The burden of this falls upon Brazil, since she has guaranteed interest upon the capital invested. She has paid more in guarantees than Argentina, and neither the railroad companies nor the people of the country have gained substantial prosperity from the existence of the roads, while the vast system that has developed in Argentina is a guaranty for commercial growth.

#### Half the Passenger Trains Taken Off.

It has been claimed by some persons who are politically prejudiced that the hard times have not affected Canada, but the assertion is refuted in a summary manner by an item just published in a Winnipeg paper. It says:

"On and after Saturday there will only be a weekly train service on the Manitoba & Northwestern from Binscarth to Yorkton (50 miles). The train will leave for Yorkton on Saturday and will return early Monday morning." By reference to the Official Guide we find that heretofore the bustling villages on this road had had a train on Thursday and Friday also. On the busy portions of the road there is a train in each direction as often as every other day.

#### A Pointed Inquiry.

The Beamless Brake Company shows its ingenuity in economizing words by issuing a circular in this form:

"Have you had a brakebeam fall to-day?"

"The —— road had one last Friday."

#### Cars Piled Forty Feet High.

##### Special to the PRESS.

Sept. 1.—A big freight wreck occurred on the main line at the Third St. crossing this morning. A brakebeam gave way, and as the train was running at a high rate of speed, twenty empty coal cars jumped the track. Broken cars were piled forty feet high. The loss to the company will be heavy. A man who was stealing a ride on one of the wrecked cars was severely injured.

"If you think the brakebeam has destroyed enough life and property, write us."

#### A New Winter Route Crossing Lake Michigan.

It is said that the success of the Toledo, Ann Arbor & Northern extension, crossing Lake Michigan from Frankfort to Keweenaw, where a connection is made with the Green Bay, Winona & St. Paul, will lead to a new winter route crossing from Milwaukee to St. Joseph in the interest of the Big Four and the Chesapeake & Ohio. With the ferry steamer built for the crossing at Mackinac to run 14 miles an hour through ice 30 in. thick it seems as if in a short time winter's ice would be no bar to lake and river transportation.

#### A Large Cable.

A new 5-in. steel cable measuring 4,500 ft., to replace the old one, has just been provided by the North British Railway Company for the steep incline on their main line between Queen street, Glasgow, and Cowlairs. This part of the system will be worked, as hitherto, by means of this endless wire rope, to which the engines of all upcoming trains are attached by a stout hemp rope and chain, and raised to the bank at Cowlairs, whence they proceed on their journey in their own steam. Trains descending this heavy gradient are equipped in front by two or more ponderous braking trucks instead of the locomotive, which sets the vehicles in motion from behind and leaves them to run by gravitation. Millions of passengers are carried over this incline yearly.—*The Engineer* (London).

#### Railroad Building in China.

It was proposed to make a junction on the Kirin line and run to Moukden, but the general in command got a number of geomancers to investigate the effect of this selection upon Moukden. They reported that the vertebrae of the dragon which encircles the holy city of Moukden would be broken by driving the long nails into them, and accordingly the general vetoed the decision of the engineers, and directed them to carry the road in a straight line from Kirin to Newchwang without approaching Moukden. The engineers reported the matter to Li Hung Chang, who wrote commanding the Tartar general for his anxiety for the geomantic influences of the ancestral home of the reigning dynasty, but adding, as his candid opinion, that these influences would be improved by the junction rather than otherwise. However, the viceroy said, as the general had vetoed the decision of the engineers, the matter must be laid before the Emperor and the works stopped until his majesty's decision was known. This seriously alarmed the general, who promptly wrote asking that the works should go on.

#### The North Union Station at Boston.

The new North Union station appears to be developing into a far more elaborate, costly and ornamental structure than was planned last winter. It looks as if

the railroad company, made confident by its legislative success last spring, regarded it no more as the temporary affair it was originally given out to be, and was building for a very much longer period than the ten years which constitute the utmost extent of the permit granted by the National Government in the matter of the bridges. But "there's many a slip," etc., and there is no telling what changes in the situation ten years will bring forth. The twentieth century will be well under way at the end of that period. The company is taking the risk with its eyes open, and cannot plead the great expense it has incurred for this structure as an excuse for letting it remain as a permanent terminal.

It is given out by the railroad interests that all that the National Government wants is the substitution of iron or masonry bridges for the present pile structures, and that the new bridges can be left at the present level, but the growth of railroad traffic means the absolute destruction of the navigability of the Charles at no very distant day, if the present system of low-level bridges is to be retained. On the other hand, with high-level bridges, the commerce of the river would soon shape itself to the new conditions.—*Boston Herald*.

#### The English and American Mails.

No little interest has been manifested these last few months—especially by Irish members of Parliament and railroad directors—in the matter of mail services to and from New York, via Queenstown, and, as recently stated in these pages, a heavy blow to the supporters of this route was expected to fall in the shape of the withdrawal of the Government sanction of the special services instituted in order to save time for the incoming mails when the steamers arrive at Queenstown some hours before the regular train departs. This plan of running a special train across Ireland, from Queenstown to Dublin, then a special cross channel steamer, and finally another special train connecting from Holyhead to London, was only initiated at the beginning of the present year, but it has undoubtedly proved of great service to business firms engaged in the American trade, saving in several instances the delay of several days which would otherwise be incurred. As an example of this may be cited a recent voyage of the "Umbria" from New York. This vessel arrived at Queenstown on Friday afternoon, and the special service was at once employed, so that the mails would reach London in time for the first delivery next morning. This gave ample time for letters to be answered by the outgoing mail on Sunday. Otherwise, by being despatched on the regular service, letters would not have been delivered in London until Saturday evening, that is, Monday morning, and the replies must have waited then for the boat on the following Wednesday, thus losing several days.

The expense of running special service has, however, proved more than was expected, and the Postmaster General has decided that it can only be sanctioned for the remainder of the present year on certain conditions which are of a somewhat stringent nature. They possess considerable interest, however, to American railroadmen, and may therefore bear quotation. Continuance is sanctioned when by means of the special service, but not unless, letters can be delivered within business hours on a day on which mail for the United States is despatched, and business men can thus be enabled to reply by that mail, and the following conditions are postulated:

1. For special trains on the Great Southern & Western of Ireland line, between Queenstown and Dublin [a distance of 177½ miles], when the number of trains run free under the contract for the ordinary service, viz., 30 a year is exceeded, a rate of not more than 2s. [say 48 cents] shall be charged per mile.

2. For special trains between Dublin and Kingstown Harbor [a distance of six miles] on the Dublin, Wicklow & Wexford line, the charge is not to exceed £25 for night trains, i. e., between the hours of 11 p. m. and 5 a. m., £2 10s. for day trains [i. e., between 5 a. m. and 11 p. m.] [These rates, of course, are approximately equal to \$25 and \$12.50; the line is a suburban road, with considerable traffic locally].

3. For special cross channel steamers from Kingston to Holyhead [a distance of 60 miles] not more than £65 [say \$325] shall be charged.

4. The present rate of payment [not specified, by the way] for special trains from Holyhead to London, on the London & Northwestern, is to be maintained, not exceeded.

The above conditions form practically the only basis upon which the English Postoffice authorities consent to pay for the special service in order that the public may benefit to the extent of saving a mail; but they serve very well to show the cumbrousness of the Queenstown mail route as compared with that via Southampton, where the letters are transhipped direct from London into the Atlantic liner ten hours earlier than they could be got to Queenstown.

#### The English Miners' Strike.

The strike of miners in England has produced a serious scarcity of coal in some quarters and it is reported that on Sept. 7 the Manchester, Sheffield & Lincolnshire Railroad issued a notice that, on account of the scarcity of fuel, 55 trains were to be taken off. The Midland Railway took off 14 trains for the same reason. Each company had already curtailed its train service in consequence of the coal scarcity.

#### Train Robbery on the Lake Shore.

Train robbers stopped the Atlantic express (Eastbound) on the Lake Shore & Michigan Southern at Kessler, Ind., about midnight on the night of Sept. 11 shot the engineer, James Knapp, wounding him severely; broke into the express car, blew open the United States Express Company's safe and took its contents, consisting of four packages. The amount of money secured by the robbers is said to have been about \$19,000. Two bars of gold, valued at \$16,000, were overlooked and the express messenger saved \$4,000 in cash by secreting the money. The number of highwaymen is estimated at from 10 to 20, and they used rifles freely. The passengers on the train were badly frightened, but were not molested. After the robbery the thieves fled into the thick timber surrounding the place where the robbery was done and the train proceeded on its way.

#### Water Power at a Cent an Hour per Horse Power.

The good people of Toronto are very much elated by an offer of Mr. E. A. Macdonald to build a canal from Georgian Bay to that city and furnish water power on the terms mentioned above. Mr. Macdonald said he firmly believed that in ten years, if a canal was constructed, there would not be a chimney in Toronto, and Alderman Leslie, who was present at the meeting at which Mr. Macdonald's proposition was offered to the citizens of Toronto, thought the canal would make

Toronto one of the largest cities on this continent if not the largest. Ex-Alderman De Foe, possibly counting up the number of hours in a working year and seeing that Mr. Macdonald would get \$30 for every horse power he might be able to sell, said "the proposition was characterized by sound business principles." After commanding the proposition by a unanimous resolution and making arrangements for a convention to further indorse the idea of building up a great manufacturing center by the aid of water power costing two or three times what it costs in Lowell, Holyoke or Minneapolis—"the meeting shook hands with itself and adjourned." There seem to have been, besides aldermen and others, at least two engineers present at the meeting, one of whom was a city official.

#### LOCOMOTIVE BUILDING.

The Seaboard Air Line is now receiving the freight and passenger engines ordered from the Richmond and Baldwin works last April. The Richmond Locomotive Works has an order for six freight engines and the Baldwin Works an order for six passenger engines, a compound engine being included in the latter order.

#### CAR BUILDING.

The Erie Car Works, Limited, of Erie, Pa., were sold on Sept. 7, and were bid in for \$34,000 by the First National Bank of Erie, Pa., which held a judgment for \$33,000.

The car works of Arthur King, at Middletown, Pa., are working on an order for 63 palace stock cars for the Burton Stock Car Co. It will require about six weeks to complete the contract.

The Litchfield Car & Machine Co., of Litchfield, Ill., resumed operations last week. The report that the works would be closed down for two months is denied. The cause of the recent shut-down was a lack of material.

#### BRIDGE BUILDING.

**Athens, O.**—An iron bridge is to be built over the Hocking River, at Hockingport, this county. It is to be 175 ft. long, with a 16-ft. roadway. The contract will be let Sept. 22.

**Dayton, O.**—The stone bridge across the canal basin extension is to be torn down and a new structure erected. The King Bridge Co. was this week awarded the contract to build bridges over the canal at Second street and Main street and one over Wolf Creek at Broadway.

**Hull, Que.**—The Secretary of the Gatineau Bridge Committee is calling for tenders for the erection of a Howe truss bridge and a draw span, with necessary wooden piers and abutments, across the Gatineau River between Hull and Gatineau Point. Tenders are also invited for a steel superstructure on said piers, plans of which must be submitted with tender. Plans and specifications can be seen at the City Hall at Hull.

**Lansing, Mich.**—The city has just completed the construction of a large iron bridge, costing \$30,000, across Grand River at Franklin street.

**Little Rock, Ark.**—The Bridge Commissioners have rejected all bids received for the building of the free bridge across the Arkansas River at this point, the bids being considered excessive. The lowest bid was \$545,000.

**Minneapolis, Minn.**—The old matter of lowering the tracks of the Hastings & Dakota Division of the Chicago, Milwaukee & St. Paul, is still unsettled. The present plan, under consideration by the city officials, calls for lowering the tracks and the immediate construction of twenty highway bridges. There are some 60 streets in all crossed by the tracks, but the city is only asking that bridges be erected at the more important crossings. It is not thought at all likely that the railroad company will accept the proposition now proposed by the city.

The East Side track-lowering of the Great Northern is progressing well and rapidly approaching completion. The Edge Moor Bridge Works have completed the erection of the bridge at Central avenue and next week will commence erecting the one at Fourth street, N. E. The iron for this bridge, also for the Second street, N. E., bridge, is now on the ground. The masonry for both of these bridges is nearly completed and that for Central avenue and Broadway is ready for the superstructure. Winston Brothers, contractors for the grading, are now excavating for the viaduct at Como avenue. When this work is completed the Great Northern will not have a single grade crossing in Minneapolis. Five streets will not be bridged at present, but, under the agreement, the city is to build these bridges when it becomes necessary.

**Ottawa, Ont.**—The Canadian Government is calling for tenders to be received by the Secretary of the Railways and Canals Department, Ottawa, up to Sept. 28, for a steel bridge composed of one swing span of 250 ft. and a fixed span of 75 ft., to carry the Canadian Pacific Railroad over the Sault Ste. Marie canal. Plans and specifications of the work to be done can be seen at the office of the Chief Engineer of Railways and Canals, Ottawa.

**Portland, Or.**—The American Bridge Works, of Chicago, have the contract for three bridges for the Portland Water Works. They are all supported on iron cylinder piers and will carry two lines of 42-in. water mains. The long span, 300 ft., crosses the Sandy River and the shorter ones, 100 ft. and 200 ft., cross Bull Run. The total cost of the improvement is about \$40,000. The structures were designed by C. F. Loweth, C. E., of St. Paul, Minn.

**Reading, Pa.**—The proposed new Schuylkill River bridge at Exeter will be a three-span structure, 140 ft. long, with two river piers.

**St. Paul, Minn.**—The city engineer has awarded contracts, amounting to \$9,653, for repairs to the Robert street bridge across the Mississippi River.

**Waxahachie, Tex.**—The Houston & Texas Central Railroad is building a new iron bridge over Waxahachie Creek, three miles west of this town.

**Zanesville, O.**—Bids for the construction of the Dresden bridge have been opened as follows: Superstructure—Bradbury & Spencer, Arizona, O., \$904; Wrought Iron Bridge Co., Canton, \$900; Variety Iron Works, \$867; Detroit Iron Works, \$797; Canton Bridge Co., \$1,150; Champion Bridge Co., \$837; Indiana Bridge Co., \$947; Massillon Bridge Co., \$880 and \$725; Columbus Bridge Co., \$914; Columbus Iron Superstructure Co., \$937; Toledo Bridge Co., \$800.

**RAILROAD LAW—NOTES OF DECISIONS.****Contracts and Construction.**

The old question of the authority of an engineer or architect to determine conclusively the questions left to his decision has been decided in two courts recently. Unless the contractor can show that the engineer's certificate has been unreasonably withheld, or can furnish evidence of fraud or bad faith on the part of the engineer, his decision will be final and conclusive when it is so stipulated in the contract. If the contract provides that the work shall be done to the satisfaction of the engineer or architect, and that any dispute as to claims for extra work shall be referred to him, and that his decision shall be final, such questions as to extra work and the performance of the contract cannot be referred to a jury in the absence of evidence of fraud of the engineer.<sup>1,2</sup> If the engineer or architect die and another is appointed by the owner and accepted by the contractor the certificate of the newly appointed engineer must be obtained as a condition precedent to recovery by the contractor.<sup>3</sup> Probably no formal acceptance in terms by the contractor would be necessary; acceptance would be implied by the court if the work was continued under the engineer's measurements and directions.

Two interesting cases in evidence are reported, one where a contractor had been prevented by the company from completing his contract and be sued for profits he would have realized if he had been permitted to complete it. The court held that written estimates of the amount and cost of work made by engineers after the letting of the contract could not be placed before the jury to disprove the amount of profits claimed by contractor.<sup>4</sup>

In another case where a contract provided that the engineer or architect should decide any dispute arising as to the meaning of drawings and specifications it was held that that fact did not render the engineer's admissions of defects admissible as evidence, if such admissions were made in the absence of the contractor, in a suit for a balance due on the contract by the contractor.<sup>5</sup>

A certain sum of money is frequently made payable in a construction contract for a delay or failure of the contractor to complete his contract by a fixed date. This sum payable cannot be collected if it partakes of the nature of a *penalty or forfeiture*. If it be a sum agreed upon as reasonable damages that the company will suffer for such delay or failure, it is called *liquidated damages*, and can be reserved from what is due the contractor, or collected from him if the amount is more than due. A recent decision of the New York Court of Appeals makes a discrimination as to the purpose of these liquidated damages, which should be considered in drafting contracts. If the payment of liquidated damages is reserved for the breach of the contract, it is good; but if it is a means to dissolve the contract, then the sum named as liquidated damages cannot be recovered.

The contract in question, which was declared to be a means of dissolving the contract, reserved to the company the right to terminate the contract at any time by formal notice in writing and upon payment to the contractor for all labor performed, and the further sum of \$3,000 as liquidated damages. It was held that the contractor could not recover the \$3,000, although the company had suspended the work.<sup>6</sup> If the contractor had shown that he had suffered damages to the extent of \$3,000, he might have recovered it, we should say, not upon the contract clause, but as damages resulting from the breach. The discrimination made by the court is not one that the average layman will appreciate, for in the case where the contractor is to pay a certain sum for failure to perform his part of the contract, if he deliberately declines to complete it he must pay the liquidated damages. The reason of the decision is probably to be found in the refusal of courts to allow liquidated damages at any time unless it was apparent when the contract was made that there would be damages approximating the sum named or that the circumstances were such that it would be impossible to estimate them. The court probably regarded the \$3,000 in this case as a penalty disguised under the name of liquidated damages.

<sup>1</sup> *Guthal v. Gow*, 55 N. W. Rep., 442.

<sup>2</sup> *Beecher v. Shuback*, 23 N. Y. Sup., 601.

<sup>3</sup> *Beecher v. Shuback* (*Com. Pl.* N. Y.).

<sup>4</sup> *Tenn. & C. R. R. Co. v. Danforth*, 13 So. Rep., 51.

<sup>5</sup> *Garnsey v. Rhodes* (N. Y. App.), 31 W. E. Rep., 199.

<sup>6</sup> *Curman v. Del. & O.*, 34 N. E. Rep., 201.

**Powers, Liabilities and Regulation of Railroads.**

In Missouri it is laid down that a direction by a mortgagor to the owner of the equity of redemption to get all the damages possible from a railroad company that proposes to construct its road across the mortgaged land does not amount to a waiver of payment of compensation as a condition precedent to entry by the railroad company.<sup>1</sup>

In North Carolina it is laid down that the statute establishing a railroad commission, and investigating the same with authority to make reasonable regulations for the prevention of excessive charges and unjust discriminations by railroad companies, is constitutional, since the act does not confer on the commission power to pass a law, but power to make regulations reviewable by the court to carry into effect a law already passed.<sup>2,3</sup>

In Missouri it is held by the Supreme Court that where a second mortgagee authorizes the mortgagor to grant to a railroad company a right of way across the mortgaged land, and he afterward buys the land on foreclosure of the first mortgage, his title acquired through such foreclosure sale is not affected by a grant to the railroad company made by the mortgagor in pursuance

of such authorization, since the grant of the mortgagor only affects the title held by the mortgagee at the time he authorized it.<sup>4</sup>

A New York statute entitled "An act to provide for a limit of hours of service on railroads," declares (Section 1) that no railroad shall permit or require trainmen who have worked 24 hours to again go on duty until they have had at least eight hours rest. Sections 2, 3, declare that 10 hours in 12 consecutive hours shall be a day's labor, and that for every hour in excess of that time the employee shall receive proportionate compensation. Section 4 makes the violation of any provision of the act a misdemeanor. The Court of Appeals holds that the prohibition is not against more than the regular day's labor, but only against the work mentioned in Section 1.<sup>5</sup>

The Supreme Court of Indiana holds that the statute requiring railroads to post notices as to whether trains are on time is not void as a regulation of interstate commerce.<sup>6</sup>

A Minnesota statute provides that "a mortgage of real property is not to be deemed a conveyance, so as to enable the owner of a mortgage to recover possession of the real property without a foreclosure." Another statute provides that "a railroad company may borrow money, and execute bonds or notes therefor, and, to secure the payment thereof, may pledge the property and income of such company." The Supreme Court holds that a railroad company could pledge in a mortgage the income of its property, and, to make such pledge effectual, stipulate that on default the trustee named in the mortgage may take possession, operate the railroad and receive its earnings.<sup>7</sup>

**Injuries to Passengers, Employees and Strangers.**

In Illinois the plaintiff was a passenger on defendant's freight train. On approaching the place to which plaintiff was going, the brakeman called out the name of the station, and then the train stopped, and plaintiff arose to leave. The train started again, with a jerk, before she could leave the car, and she was thrown down and injured. The Supreme Court holds that defendant was negligent, since, after the announcement by the brakeman, it was his duty to hold the train long enough at the first stop to permit the passengers to alight.<sup>8</sup>

In Indiana the complaint alleged that plaintiff assisted his invalid daughter onto defendant's train, and before he could leave it the train started; that he notified the conductor, who pulled the cord, and, after waiting awhile, directed him to alight, which he did, and was injured, the cars being still in motion, though he did not know it, the night being very dark. The Supreme Court rules that it cannot be said as a matter of law that he was guilty of contributory negligence.<sup>9</sup>

In Iowa the evidence showed that plaintiff went upon the train to accompany his wife and child; that when the conductor called, "All aboard," he started to leave the train, but found the door of the vestibule locked; that the brakeman first told him he could not get off, and that it would break his neck, but afterward said to him, "You get off," and opened the door, which he shut again as soon as plaintiff had passed through it to the platform steps. Plaintiff jumped from the train and was injured, the train then being in rapid motion. The Supreme Court rules that the evidence justified a verdict for plaintiff.<sup>10</sup>

The Supreme Court of Texas holds that a condition of a ticket stating that it is not good for return passage unless the holder identifies himself to the agent of the connecting road at M. "on or before Jan. 20, 1888, and when officially signed . . . by said agent, this ticket shall be good only three days after such date," means that the journey is to be completed within the three days, and not merely commenced within that time.<sup>11</sup>

The Supreme Court of Arkansas holds that a railroad company, in operating a freight train with caboose attached for passengers, is not bound to the utmost diligence which human skill and foresight can effect, but it is required to use the highest degree of practical care, diligence and skill that is consistent with the operation of its road and that will not render its use impracticable or inefficient for its intended purposes.<sup>12</sup>

In Kentucky, it is held that where a passenger is permitted, at his own solicitation, to travel on a freight train, he takes upon himself the additional risks, if any, in excess of the risks incident to a passage on the same road in a passenger train, but he assumes no greater risk as to the condition of the track for the safety of trains moving on it.<sup>13</sup>

In Missouri in an action by a freight engineer against a railroad company for personal injuries received by reason of several cars in his train leaving the track while rounding a curve, there was evidence that the road was not ballasted; that the ties were rotten at the place of the accident; that the outside rail on the curve was lower than the inside rail; that the brakes on the caboose were defective, and that one of the cars was very heavily loaded. The Supreme Court holds that the court properly charged that, if defendant's roadbed and track were not in a reasonably safe condition for the passage of trains at the place of the accident, on account of rotten ties, or failure to properly ballast the roadbed, or on account of the inside rail of the curve being higher than the outside rail, and the defendant knew, or by the exercise of ordinary care might have known, of the condition of the ties, roadbed and track before the accident, and if defendant provided for use in the train a caboose with a defective brake and placed in the train a car so heavily loaded that it would not adjust itself to the track in passing over the same, and by reason of any or all of these conditions, if they were found to exist, plaintiff was injured without his fault—defendant was liable.<sup>14</sup>

In Massachusetts there was evidence that when deceased's train left a station he was ordered to get on top of a high refrigerator car attached to the rear of the caboose; that he was seen getting on the car, holding to the brake wheel; that his duty required him to watch the rear end of the train; that he was skillful in his business, and had entered defendant's service about two weeks prior to his death; that he was knocked off the car and killed by a bridge under which his train passed a few miles from the station, and that the tell-tales to the bridge were gone, and had been for several days prior to the accident. The Superior Court holds that the evidence justified the inference that deceased was exercising due care, since he was required to look out for a bridge only when warned by the tell-tales.<sup>15</sup>

In North Carolina it is decided that where a brakeman is crushed through the absence of bumpers on the cars he is called upon to couple on a dark night, of the condition of which he could not have previously informed himself, the company is liable, whether such cars belong to it or another railroad.<sup>16</sup>

The Court of Appeals of Kentucky rules that it cannot be said, as matter of law, that a person traveling on a highway parallel with a railroad, and who has turned several times to look for a train, the last time when

within 100 yards of a crossing, and seeing none for a mile back, is guilty of negligence in attempting to cross without again looking particularly where he had reason to believe that the train, which was overdue, had already passed, and, if not, that the whistle would be sounded.<sup>17</sup>

In Texas it is held that a railroad company is not liable for death caused by the gross negligence of its servants, where deceased was guilty of contributory negligence.<sup>18</sup>

<sup>1</sup> *Snyder v. Ch.*, S. F. & C., 20 S. W. Rep., 885.

<sup>2</sup> *Atlantic Exp. Co. v. Wilm. & W.*, 16 S. E. Rep., 393.

<sup>3</sup> *Snyder v. Ch.*, S. F. & C., 20 S. W. Rep., 885.

<sup>4</sup> *People v. Phyfe*, 32 N. E. Rep., 978.

<sup>5</sup> *State v. Indiana & L. S. R. Co.*, 32 N. E. Rep., 817.

<sup>6</sup> *Seibert v. M. & St. L.*, 33 N. W. Rep., 1151.

<sup>7</sup> *C. & A. R. R. v. Arnold*, 33 N. E. Rep., 204.

<sup>8</sup> *E. & T. H. v. Athorn*, 33 N. E. Rep., 461.

<sup>9</sup> *Galloway v. C. R. I. & P.*, 54 N. W. Rep., 447.

<sup>10</sup> *G. C. & S. F. v. Wright*, 21 S. W. Rep., 399.

<sup>11</sup> *St. L. I. M. & S. v. Sweet*, 21 S. W. Rep., 587.

<sup>12</sup> *Ohio Val. Ry. v. Watson*, 21 S. W. Rep., 214.

<sup>13</sup> *Gorham v. K. C. & S. Ry.*, 20 S. W. Rep., 1,060.

<sup>14</sup> *Maher v. B. & A.*, 32 N. E. Rep., 950.

<sup>15</sup> *Mason v. R. & D.*, 16 S. E. Rep., 698.

<sup>16</sup> *Wright v. C. N. O. & T. P.*, 21 S. W. Rep., 881.

<sup>17</sup> *Texas & N. O. Ry. Co. v. Brown*, 21 S. W. Rep., 421.

**MEETINGS AND ANNOUNCEMENTS.****Dividends:**

Dividends on the capital stocks of railroad companies have been declared as follows:

*Atlanta & Charlotte Air Line*, semi-annual, 3 per cent., payable Sept. 8.

*Boston & Albany*, quarterly, 2 per cent., payable Sept. 30.

*Chicago & Eastern Illinois*, quarterly, 1½ per cent. on the preferred stock, payable Oct. 2.

*Manhattan Elevated*, quarterly, 1½ per cent., payable Oct. 2.

*New York, New Haven & Hartford*, quarterly, 2½ per cent., payable Oct. 2.

*Oregon Railway & Navigation Co.*, quarterly, 1½ per cent., payable Oct. 2.

**Stockholders' Meetings:**

Meetings of the stockholders of railroad companies will be held as follows:

*Atchison, Topeka & Santa Fe*, annual, Topeka, Kan., Oct. 26.

*Chicago, Detroit & Canada Grand Trunk Junction*, annual, Detroit, Mich., Sept. 27.

*Chicago, Milwaukee & St. Paul*, annual, Milwaukee, Wis., Sept. 20.

*Illinois Central*, annual, Chicago, Oct. 18.

*Lake Erie & Western*, annual, Peoria, Ill., Oct. 4.

*Louisville & Nashville*, annual, Louisville, Ky., Oct. 4.

*Louisville, New Albany & Chicago*, annual, Indianapolis, Ind., Sept. 20.

*Michigan Air Line*, annual, Detroit, Mich., Sept. 27.

*New York, Ontario & Western*, annual, New York City, Sept. 27.

*Northern Pacific*, annual, Mills Building, New York City, Oct. 19.

*Old Colony*, annual, Boston, Mass., Sept. 26.

*Peoria, Decatur & Evansville*, annual, Pekin, Ill., Oct. 3.

**Technical Meetings:**

Meetings and conventions of railroad associations and technical societies will be held as follows:

*The American Association of General Passenger and Ticket Agents* will hold a semi-annual meeting at the Plankinton Hotel, Milwaukee, Wis., on Sept. 19.

*The Western Railway Club* meets in room 730, The Rookery Building, Chicago, on the third Tuesday in each month, at 2 p. m. The next meeting is Sep. 19.

*The New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7:30 p. m.

*The Northwest Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, except June, July and August, at 8 p. m.

*The American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

*The Central Railway Club* will meet at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of September.

*The Southern & Southwestern Railway Club* will meet at the Kimball House, Atlanta, Ga., Sept. 21, at 10 a. m.

**Master Car-Builders' Association Committees:**

The Executive Committee has arranged the following committees of investigation for 1894:

*1. Tests of M. C. B. Couplers.*—To arrange for and conduct further tests, if necessary, and to consider and report upon all other questions connected with M. C. B. couplers which the Committee finds desirable. J. M. Wallis, J. S. Lentz, R. D. Wade, J. H. McConnell, S. A. Crone, T. G. Duncan.

*2. Air-Brake Tests.*—To investigate and report in detail what further tests are necessary to insure the best available service. G. W. Rhodes, S. P. Bush, George Gibbs, A. S. Vogt, E. A. Williams.

*3. Steel-Tired Wheels.*—To investigate further and report, embracing all steel-tired wheels in use, and to give the number of parts and weight of principal parts, method of tire fastening, illustrated by drawings, and liability of parts to get loose. Also to describe methods of re-tiring, and to consider proper limits of thickness for tires. R. E. Marshall, J. O. Pattee, C. H. Cory, A. E. Mitchell, H. Bartlett, T. A. Bissell.

*4. Road Tests of Brake-Shoes.*—To conduct and report upon a series of comparative tests of different brake-shoes in actual service, with as complete data as possible. R. H. Soule, W. S. Morris, S. A. Crone, G. W. Rhodes, A. E. Mitchell, W. H. Lewis, J. W. Marden, A. M. Waitt, Jos. Townsend, Sam'l Porcher, J. C. Barber, W. L. Hoffecker.

*5. Laboratory Tests of Metal for Brake-Shoes.*—To conduct and report upon laboratory tests of different brake-shoes, with as complete data as possible. S. P. Bush, D. L. Barnes, J. W. Cloud.

*6. Brake-Beams.*—To consider the recommendations made by Committee on Brake-Beams in its report of 1893, and to recommend in detail what steps are necessary to secure greater uniformity. E. D. Nelson, J. H. Rankin, John Bean.

*7. Safety-Chains for Freight Cars.*—To report recommendations for standard location and arrangement to suit freight cars of all classes, and to recommend prac-

tice for attaching same. H. Coulter, W. H. Day, J. E. Simons, E. E. Carver, J. J. Casey.

8. *Heating Passenger Equipment.*—To report what progress is being made in heating cars by steam or other improved methods, and to review the different plans now in use. W. L. Hoffecker, Jas. Macbeth, Geo. F. Wilson, A. J. Cromwell, John Hodge.

9. *Ventilation of Passenger Equipment.*—To investigate systems now in use, and to offer suggestions as to the correct principles for ventilation. R. P. C. Sander-son, Wm. Forsyth, A. C. Robson, G. W. West, J. M. Holt.

10. *Lighting Passenger Equipment.*—To consider progress made in advanced methods for same. C. A. Schroyer, W. H. Fry, L. B. Paxson, Wm. Apps, L. Packard.

11. *Wheel and Flange Gauges.*—To prepare maximum gauges for thickness of wheel flanges, and to consider wheel gauges in their relation to the track; also to offer any suggestions as to wheel and track gauges, and to confer with similar committees from other associations, should such be appointed. J. N. Barr, Thos. Anderson, T. Sutherland, Jos. Townsend, Thos. Fildes.

12. *Lubrication of Cars.*—To consider the practice on different roads as to lubrication and the prevention of hot boxes; also the kind and quality of lubricants used, with cost of same. A. M. Waitt, W. H. Thomas, I. E. Wood, F. A. Stinard, W. K. Carr.

13. *Air-Brake and Hand-Brake Apparatus on Cars.*—To report upon what is being done and what should be done to improve the maintenance of same on both freight and passenger equipment, and to insure the best possible service. E. D. Bronner, Pulaski Leeds, Jas. McGee, Wm. McWood, W. P. Siddons.

14. *Compressed Air Appliances and Hydraulic Machinery.*—To report upon the application and utility of such apparatus for use in car shops. J. C. Barber, Wm. Garstang, Wm. Cormack, H. L. Preston, J. R. Skinner.

15. *Freight Car Trucks.*—To consider the advisability of adopting standard sizes and shapes for arch bars and channel transoms for diamond truck, and to recommend sizes and shapes if desirable, and to ascertain the results obtained from the use of trucks of various designs, with special reference to the newer forms of trucks. J. J. Hennessy, Samuel Irvin, Wm. Voss, John H. Davis, F. H. Stark.

#### PERSONAL.

—Mr. Edward W. Dantel, Auditor and Paymaster of the Macon, Dublin & Savannah road, in Georgia, died at Macon, Ga., last week of consumption.

—Mr. G. B. Stephens, Section Master of the International & Great Northern road at Spring, Tex., has been appointed Division Road Master, with headquarters at Houston, Tex.

—Hon. Thomas M. Cooley, ex-Chairman of the Interstate Commerce Commission, was chosen President of the American Bar Association at the recent annual meeting of that body.

—Mr. Peter E. Farnum resigned this week as President of the Port Jervis, Monticello & New York Railroad, and Mr. Benjamin Ryall, General Manager of the road, has been elected to fill the vacancy.

—Mr. John T. McBride has been appointed Manager of the Everett & Monte Cristo Railroad, in Washington, which is to be opened for traffic shortly. Mr. S. M. Baird has been appointed Auditor of the company.

—President S. H. H. Clark, of the Union Pacific, returned to Omaha last week. He has spent two or three months in the mountains of Pennsylvania, and the change of climate and rest have fully restored his health.

—Mr. Henry S. Drinker, General Solicitor of the Lehigh Valley Company, and Mr. Beaujeau, Borer were this week elected directors of the Lehigh Valley to succeed the late Dr. R. A. Lamberton and George C. Thomas, resigned.

—Mr. George H. Williams, Assistant Superintendent and Superintendent of Telegraph of the Pittsburgh & Western, resigned those positions on Sept. 1. The office will be abolished. Mr. Williams had been in the service for about three years.

—Mr. C. W. Walker, Master Machinist of the Seaboard & Roanoke Railroad, has been appointed Master Machinist of the Raleigh & Gaston road, which is operated as part of the Seaboard Air Line. His headquarters will remain in Portsmouth, Va.

—Mr. R. B. Fowler, who for several years past has been Chief Clerk under Division Superintendent W. T. Kelley, of the St. Louis, Iron Mountain & Southern at Little Rock, Ark., has resigned to accept the position of General Superintendent of the White & Black River Valley Railroad, with headquarters at Newport, Ark.

—Mr. J. Kemp Ridgely, of the Louisville & Nashville, has been promoted to be District Passenger Agent at Memphis to succeed Mr. John A. Scott, resigned. J. A. Hoyland, of the company, until recently City Passenger Agent at Cincinnati, has been appointed Passenger Agent at Birmingham, Ala., to succeed Mr. Ridgely.

—Mr. J. H. Heckman has resumed his former title of General Freight Agent of the Lehigh Valley, which he held before the lease to the Philadelphia & Reading. Mr. Charles S. Lee, who was recently appointed General Passenger Agent of the Lehigh Valley, reached Philadelphia this week, and has assumed the duties of his new position.

—Mr. J. W. Lattig was last week reappointed Superintendent of Telegraph on the Lehigh Valley. Mr. Lattig resigned this position in 1892 to become General Superintendent of the National Railway & Signal Co., of Easton, Pa. Latterly he has been General Superintendent of the Electric Secret Service Co., of New York City.

—Mr. George S. Jones, Vice-President of the North American Company, died suddenly at his home in West Orange, N. J., last week. In addition to being Vice-President of the North American Co., Mr. Jones was Secretary and Treasurer of the St. Paul & Northern Pacific Railroad, and President and Receiver of the Norfolk, Albemarle & Atlantic Railroad.

—Prof. Herrmann Fritz, of the Polytechnic School at Zurich, Switzerland, died on Aug. 16, having been active in the department of machine construction and mechanical drawing at that school for over 30 years. He was the author of a number of scientific works, having translated into German, among other works, Professor Unwin's well-known text-book on the "Elements of Machine Design."

—Mr. Henry A. Cummings, Assistant to the Treasurer of the Southern Pacific Company, died at his residence in San Francisco suddenly on Aug. 29 of apoplexy. He entered the employ of the company as a boy and was in its service nearly 25 years. He was Cashier for a number of years, and in April, 1892, was promoted to be Assistant to the Treasurer, when Mr. N. T. Smith succeeded Mr. Timothy Hopkins as Treasurer.

—Mr. S. L. Bean has been promoted to be Master Mechanic of the Minnesota and Lake Superior divisions and Branches of the Northern Pacific, with headquarters at Brainerd, Minn., vice Mr. A. Bardsley, resigned. Mr. Bean's jurisdiction has been extended over the Car Department at all points on these divisions, except St. Paul and Minneapolis. He has been heretofore Master Mechanic of the shops at Fargo, N. D.

—Mr. W. W. Reynolds, Master Mechanic of the Chicago Division of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Logansport, Ind., retired from that position Sept. 1, as noted last week. He has been assigned to lighter work in the office of the Superintendent of Motive Power at Columbus, O. This change is made on account of Mr. Reynolds' advancing age and poor health. He has been with the Pennsylvania lines as Master Mechanic at Columbus and Logansport since 1882, and for 11 years prior to that date was foreman of the machine shops of the New York Division of the Pennsylvania road at Jersey City, N. J.

—Mr. Edwin H. Abbot, of Boston, President of the Wisconsin Central, has resigned from the Board of Directors of the Northern Pacific Railroad on account of his position in the litigation of the Wisconsin Central against the Northern Pacific. Mr. Colgate Hoyt and Mr. Charles L. Colby, of New York, who with Mr. Abbot are the trustees of the Wisconsin Central, holding the whole of the company's stock, have tendered their resignations as directors of the Northern Pacific for the same reason. Mr. David S. Wegg, of Chicago, President of the Chicago & Northern Pacific, has also resigned from the Northern Pacific Board of Directors.

—Mr. C. H. Rockwell has been appointed General Passenger Agent of the Cleveland, Akron & Columbus, succeeding Mr. W. C. Rinearson, who is now with the Queen & Crescent lines as General Passenger Agent. Mr. Rockwell recently resigned as Assistant to the President of the Chicago & Eastern Illinois. He was formerly General Passenger Agent of the Cincinnati, Hamilton & Dayton for several years and resigned to go to the Pullman's Palace Car Co. as Secretary to the President. From Nov. 1, 1889 to Nov. 1, 1891 he was General Superintendent of the Columbus, Hocking Valley & Toledo. He was General Superintendent also of the Chicago & Eastern Illinois until his appointment as Assistant to the President.

—Mr. Henry C. Ives, Assistant to the First Vice-President of the Atchison, Topeka & Santa Fe, was among the killed in the bridge disaster on the Boston & Albany, near Chester, Mass., on Aug. 31. He was on his way to meet his daughter, who had been spending the summer in Massachusetts. Mr. Ives was Division Superintendent on the Atchison, Topeka & Santa Fe for over two years and in January last became Purchasing Agent. He was appointed Assistant to Vice-President Robinson soon after the latter's appointment to that position. Mr. Ives was for 11 years in the operating department of the Great Northern, and had been connected with the Missouri Pacific and Northern Pacific, his railroad service having begun on the latter road in 1871.

—Mr. A. S. Garretson, of Sioux City, Ia., who has been at the head of the local syndicate which built the Sioux City & Northern Railroad, and has been President of the company since its organization, resigned this week both as President and Director. The railroad is hereafter to be operated in connection with the Great Northern system, and Colonel W. P. Clough, Vice-President of the Great Northern line, has been elected Director of the Sioux City & Northern. The office of President remains vacant for the present. Mr. J. S. Beals, who is connected with the Great Northern at St. Paul, has been elected Secretary, Treasurer and Auditor. The office of Secretary and Treasurer, is now held by George W. Oakley, and that of Auditor by George Hills. Mr. W. B. McNider, who has been General Passenger Agent, has been appointed General Freight and Passenger Agent.

—Mr. John T. R. McKay, General Freight Agent of the Lake Shore & Michigan Southern Railroad, died at his home in Cleveland, O., on Sept. 5, of paralysis of the heart. Mr. McKay had been an invalid for nearly three years. Part of the time he was able to attend to the general oversight of the department, but for some time past he had frequently to give up all thought of business and seek temporary relief at some health resort. He was born at Toronto, March 31, 1838, but came to the United States in early boyhood, and began his railroad career in 1854 as a clerk for the old Cleveland & Toledo road. He filled various minor clerical positions until 1865, when he became reporting clerk of the freight department of the Cleveland, Painesville & Ashtabula Railroad. He resigned that position in 1867, to become agent of the Merchants' Dispatch Transportation Co. at Cleveland, being promoted in 1868 to the General Agency of the company. On July 1, 1869, he entered the service of the Lake Shore & Michigan Southern as Chief Clerk of the general freight department. On Jan. 15, 1877, he was made Third Assistant Freight Agent. From Sept. 1, 1881, to April 28, 1885, he was First Assistant, and on the latter date was appointed General Freight Agent.

—Mr. Charles Roberts Johnson, the well known signal engineer, and President of the Johnson Railroad Signal Co., died on Sept. 11, at Saranac Lake, N. Y., where he had been for a long time in the hope of regaining his health. He was born at Higham Ferrers, Northamptonshire, England, and was in his 43d year. Mr. Johnson was the principal pioneer in the introduction of excellent features of English practice in railroad signaling into this country. He studied signaling under Mr. Henry Johnson, who was for many years Superintendent for Saxby & Farmer, the well known engineers of London. He afterward carried out contracts for that firm in France, Belgium, and India. In the latter country he contracted jungle fever from which he never entirely recovered. Coming to the United States in 1881 by invitation of Mr. Frank Thomson of the Pennsylvania Railroad to make a report on the proposed protection of the Elizabeth grade crossing, his ability was recognized at once and Mr. Westinghouse made arrangements to retain his services. He was appointed General Manager and Signal Engineer of the Union Switch & Signal Co. in 1886. In 1888 he established the Johnson Railroad Signal Company at Rahway, N. J., which has come to be an important and well known establishment. The strain upon his energies in making a success of this new com-

pany did more than anything else to cause, after a lingering sickness for two years, what his many fast friends in railroad circles must consider his untimely death. Mr. Johnson was married in 1886 to Miss Georgina Miller, of New York City, who survives him.

#### ELECTIONS AND APPOINTMENTS.

*Central of New Jersey.*—C. E. Hungerford, of Wilkes-Barre, Pa., has been appointed General Storekeeper, with headquarters at Jersey City, N. J.

*Great Northern.*—W. C. Toomey, formerly with the Mille Lacs Lumber Co., has been appointed Chief Clerk in the office of President Hill, at St. Paul. He succeeds F. L. Moffatt, resigned, who had been Chief Clerk for about three years.

*Gulf, Colorado & Santa Fe.*—The division headquarters of the company at Cleburne are to be removed to Fort Worth, Tex., in October. Fort Worth is about 30 miles north of Cleburne.

*Lehigh Valley.*—J. W. Lattig has been appointed Superintendent of the Telegraph Lines and Electrical Apparatus of this company upon its entire system. His headquarters will be at South Bethlehem, Pa., and he will report to the Acting General Manager.

*Wabash.*—The annual meeting was held at the company's office in St. Louis, Sept. 12. There were over 641,000 shares voted out of the total of 805,000. The present Board of Directors were unanimously re-elected as follows: O. D. Ashley, George J. Gould, Edgar T. Welles, Henry K. McHarg, C. J. Lawrence, P. B. Wyckoff, S. C. Reynolds, Edwin Gould, Thomas H. Hubbard, John T. Terry, Russell Sage, C. C. MacRae and Francis Pavay. O. D. Ashley was re-elected President.

#### RAILROAD CONSTRUCTION, INCORPORATIONS, SURVEYS, ETC.

*Cambridge & Chesapeake.*—The directors of this projected railroad held a meeting at Cambridge, Md., last week, at which, it is reported, arrangements were made for the financial part of the enterprise. The line is to be about 50 miles long, beginning at Cambridge, on the Philadelphia, Wilmington & Baltimore, and extending to a point on Chesapeake Bay, in the southern part of Dorchester County. Dr. Elias Jones, of Cambridge, is President.

*Cools Bay, Roseburg & Eastern.*—This road is now completed and in operation from Marshfield on Coos Bay south to Myrtle Point, Or., 27 miles, the track having reached Myrtle Point a few weeks ago, as noted at the time. R. A. Graham, who is building the railroad, announces that the engineers are resurveying the route from Myrtle Point east toward Roseburg, Or., on the Southern Pacific, a distance of 60 miles. The extension of the line beyond Myrtle Point has been commenced with a small force, and it is hoped to keep the construction work going on for some months yet and perhaps to increase the present force when the ballasting of the new road into Myrtle Point is completed.

*Helena & Castle.*—The engineers who began the relocation of this line from Helena a couple of weeks ago are now nearing the Missouri River crossing selected by the engineers who made the survey made in the fall of 1892. R. R. Harlow, of Helena, who is the chief projector of the new road, has started the grading near Helena and has three contractors working on the first 15 miles east of that town.

*Kansas City, Pittsburg & Gulf.*—The completion of the connecting link between Pittsburgh, Kan., and Joplin, Mo., was announced this week. It is proposed to begin running through trains from Kansas City to Sulphur Springs, a distance of 212 miles, on Sept. 10. The extension just completed is about 30 miles long, and was built to connect the Kansas City, Pittsburgh & Gulf with the Kansas City, Fort Smith & Southern road, which extends to Sulphur Springs, and is controlled by the former company. The gross earnings of the company for the first eight months of 1893 are reported as \$101,461, as compared with \$35,431 for the same period of 1892. The increase in mileage has been 100 miles, but the company has only been operating the entire additional mileage since May 15.

*La Porte, Houston & Northern.*—The officers of the company announce that the track is to be laid on this road between Harrisburgh and La Porte, Tex., during October. J. H. Tenant, the Treasurer of the company, has recently returned to Houston from New York where he placed orders for the rails for completing the line, and arranged to have the first shipment made from that city on Sept. 9. It is proposed to complete at once the main line of the road from La Porte on Trinity Bay to Harrisburgh, near Houston, where connection will be made with the Galveston, Houston & Henderson road. By building about a mile of road a junction will be made with the Houston & Magnolia Park Belt road, and trains will be run into Houston over the tracks of that road. This will be the first new work to be undertaken, but it is also proposed to complete the extension to connect with the North Galveston, Houston & Kansas City road near Clear Creek. This will require the building of about 16 miles of road, about half of this being already graded. The line between La Porte and Harrisburgh was completed ready for the tracklaying in the last months of 1892, but since then no construction work has been done.

*Montreal & Western.*—The engineers of the Canadian Government have accepted the last section of this road to St. Jovite, Que., and the train service will be extended to that town immediately. The road is operated by the Canadian Pacific and the previous northern terminus has been at Ste. Agathe, Que.

*Nelson & Fort Shepherd.*—Since the construction of the bridge across the Pend Oreille River, north of Northport, Wash., the construction work has proceeded very rapidly. The track has been laid north of Waneta, B. C., at the Pend Oreille River, for a distance of seven or eight miles, and the grading is finished ten miles beyond. Nearly all the bridges on the line are finished and there is little reason to doubt that the principal work will be finished in October and the track laid into Nelson, B. C.

*Ohio Southern.*—Nearly all the contractors on the extension into Lima, O., have completed their contracts, Hayes Bros., who had a section near Lima, being about the last to remove from the work. The track is now being laid, and, as this is the only work remaining unfinished, the trains will probably be running into Lima in a month. The line is 60 miles long, beginning at Springfield, O.

**San Pete Valley.**—The tracklaying on the extension through the San Pete Valley in Utah reached the town of Ephraim on Sept. 15. This leaves about 8 or 10 miles to complete the line into Manti, Utah, which is to be the southern terminus, and the line will probably reach this town this or next week. Theodore Bruback, of Salt Lake City, is President.

**Toledo & Ohio Central.**—The Columbus extension of this railroad, upon which the grading was begun in April, is reported to be practically completed as far as Mound, O., which is on the Pittsburgh, Cincinnati, Chicago & St. Louis and is the station on the new line nearest to Columbus. It is expected that the line will be ballasted its entire length early in October, and that the trains will be running into Columbus before Nov. 1. The extension is 50 miles long and begins at Ridgeway, which has been the southern terminus of the road since 1891. There is said to be on one section of the extension a stretch of track 20 miles long that is practically a straight line and having a nearly level grade.

**Western Maryland.**—The extension of the railroad from Porter's Station, on the Baltimore & Harrisburg, to York, Pa., was formally opened for freight and passenger traffic Sept. 12. President John M. Hood, the directors of the road, and a number of other guests went over the line in a special train on that day. The line was projected to form a connection with the Philadelphia & Reading Railroad at a point on the Susquehanna River. The length of this whole line is 20 miles, about half of which is now completed and ready for operation. This extension was conceived simultaneously with the Potomac Valley Railroad, by which the Western Maryland makes connections with the Baltimore & Ohio from Williamsport to Cherry Run. This branch of the road has been in operation for more than a year.

#### GENERAL RAILROAD NEWS.

**Chicago, Milwaukee & St. Paul.**—The annual report gives the following summarized table of earnings and expenses for the year ending June 30:

	1893.	1892.	1891.
Gross earn.	\$33,975,053	\$32,293,508	\$27,504,224
Oper. expen.	22,488,107	20,815,04	18,361,500
Net earn.	\$11,486,946	\$11,483,503	\$9,137,724
Other income	122,139	237,353	418,424
Total	\$11,609,085	\$11,705,856	\$9,556,148
Fixed charges	7,086,685	7,274,150	7,321,468
Seven per cent. on preferred	1,797,172	1,572,612	1,532,150
Two per cent. on common	919,153	92,545	.....
Surplus	\$1,806,075	\$1,938,550	.....

**Detroit, Bay City & Alpena.**—Application was made this week to Judge Swan, in the United States Circuit Court, at Detroit, for the appointment of a Receiver for the above railroad. The applicants, the Farmers' Loan & Trust Co., of New York, asked that M. L. Scudder, of Chicago, be appointed. The company asked that if a Receiver be appointed it be General Alger, President of the road. No decision was made.

**Duluth, Missabe & Northern.**—The first \$100,000 in currency necessary for liquidating the debts of this road reached Duluth last week. The officials state that the other \$300,000 will be received before Sept. 15 from the New York syndicate. Several liens have been filed with the Secretary of State against the company, and an effort was made by some of the creditors to have a majority of them ask for a receiver. From appearances the road is now all right financially.

**Evansville & Terre Haute.**—An application for the appointment of a receiver for the road was made before Judge Briggs in the United States Circuit Court in Terre Haute, Ind., last week by the Sullivan County (Ind.) Bank. The complaint alleged that the Louisville, Evansville & St. Louis, Peoria, Decatur & Evansville and Chicago & Ohio railroads, owned principally by D. J. Mackey, are all officered and controlled by the same persons that control the Evansville & Terre Haute, and that there is a common Treasurer, into whose hands the earnings of all these roads are paid. It was claimed in the petition that funds properly belonging to the company had been diverted to these other companies, that its credit had been wrongfully used for the benefit of those companies. It was also charged that the company had a large floating debt, and that it was insolvent. The Court at once appointed G. J. Grammar, President of the road, Receiver, on hearing the petition. Mr. D. J. Mackey was formerly President of the company, but lost control at the annual meeting in 1892, when Mr. Grammar was elected President. Recently Mr. Mackey was elected Chairman of the Board of Directors, and with his friends is understood to control a majority of the stock. When the appointment of the Receiver was announced, it was asserted by the directors that neither the directors nor the attorney had been informed of the proceedings, nor were they given the opportunity to be heard. The directors declared the proceedings to be unwarranted, protesting against the step, and declaring the company solvent in every respect. They directed Chairman Mackey and the other executive officers to take immediate action to cause the receivership to be vacated. The firm of Harvey Fisk & Co., of New York, which negotiated the recent sale of \$2,500,000 of the company's bonds, issued a circular criticising the financial management of Mr. Mackey, and asking for proxies to be used at the annual meeting in October. In a few days they withdrew this request, announcing that an agreement had been reached which would protect all interests. President Grammar, on Sept. 9, filed a statement with the Court, asking that he be discharged as Receiver, since the parties to the suit had agreed to dismiss it. The Court then declared the road solvent, dismissed the Receiver, and ordered all property returned to the company.

President Grammar is announced to have tendered his resignation, and Mr. Mackey is expected to succeed him.

**Illinois Central.**—The earnings from traffic for the month of July, 1893 and 1892, are reported in the following table:

	1893.	1892.	Inc.
Miles oper.	2,888	2,888	.....
Gross earn.	\$1,789,736	\$1,449,506	I. \$340,170
Oper. expen. and taxes	1,258,332	1,243,604	I. 16,728

Net earn.... \$331,404 \$205,902 I. \$325,442

The gross receipts from traffic for the month of August, 1893, are estimated at \$1,853,035; the receipts for August, 1892, were \$1,591,017, an estimated increase of \$262,018.

**Lehigh Valley.**—The directors at their meeting in Philadelphia, this week, voted to pass the quarterly dividend of 2½ per cent, payable in October. The directors in their explanatory statement to the stockholders say: The company has been in receipt of only about one month's earnings from transportation since the repossession of its lines, and these are required to meet interest on the bonded debt; and, in a period of exceptional financial stringency like the present, a sound business policy dictates the wisdom of lessening interest charges by the application of available surplus earnings to the reduction of the company's indebtedness and the accumulation of an ample working capital; therefore it is deemed expedient to defer consideration of a dividend upon the common stock for the present.

**Mobile & Girard.**—The directors have declined to consider the proposition of Receiver Comer, of the Central of Georgia, to surrender the lease of the road held by that company. They passed the following resolutions: *Whereas*, in view of the fact that proceedings now pending in the United States Court to foreclose the mortgage given by this company to secure bonds, and because of great interruption to trade and travel that would arise if the company should be unable to operate the road, if in its possession, therefore be it Resolved, That the directors decline to accept the surrender of the Mobile & Girard tendered by H. M. Comer, Receiver of the Central of Georgia, under order of the Court, and deem it advisable that the Receiver shall continue to operate said road as provided by order of the United States Court, passed June 30, at Savannah, Ga.

**New York Central & Hudson River.**—The gross earnings of the company for August, 1893, are reported as amounting to \$4,063,912 as against \$4,061,441 gross earnings in August, 1892, showing a decrease of \$2,471.

**Northern Pacific.**—The estimated gross earnings of the Northern Pacific for the month of August, 1893, were \$1,866,641. These figures compared with the actual gross earnings for the same period in 1892, \$2,272,668, show a decrease of \$406,027.

**Peoria, Decatur & Evansville.**—A mortgage was filed in Indiana this week to secure an issue of bonds to the amount of \$10,000,000. The bonds under this mortgage were authorized last March. They will be used to take up \$4,844,000 existing bonds of the company, and to retire bonds of the Chicago & Ohio River Railroad, which has been consolidated with the above company this year.

**Southern Pacific.**—The directors at a meeting in San Francisco, on Sept. 12, decided to issue \$89,000,000 of five per cent. bonds, secured by a first mortgage on all the road's property in California. The purpose is to retire all the earlier bonds, amounting to \$50,000,000, and bearing six per cent. interest. The remaining \$40,000,000 will be expended, it is reported, in building new lines. This action will not increase the bonded indebtedness. Originally the California lines were mortgaged for \$40,000 a mile, but this has been reduced through the sinking fund and by the sale of lands, to \$22,500 a mile.

**Union Pacific.**—President Clark, who recently returned to Omaha, has denied the reports that have been circulated in the West that the company would apply for a receiver. He said in an interview: I have not been advised of anything that would suggest the idea of the Union Pacific being placed in the hands of a receiver. The business of the company has fallen off to a large extent, but operating expenses have been greatly reduced, and I do not think a receivership will be necessary. Business on the road ought to improve soon. The chances for a strike are rather remote. The reduction in salaries has been only temporary, and as soon as business revives salaries will be put back at the old figures.

**Wisconsin Central.**—The company has filed a supplementary petition with Judge Jenkins, of the United States Court at Milwaukee, asking that the Northern Pacific Receivers be ordered to deliver the Wisconsin Central road to the officers of the company. The petition sets forth that the rents for June, amounting to \$151,000, due in 60 days, has not been paid. Judge Jenkins recently gave the Receivers until Sept. 15 to elect whether they will give up the Central road or not.

#### TRAFFIC.

##### Traffic Notes.

Boats on the Erie Canal are now getting five cents a bushel for grain from Buffalo to New York.

The Mexican Railway (Vera Cruz to City of Mexico) will establish traffic agencies in the United States. A New York agent has already been appointed.

The express companies doing business in Missouri, after a conference with the State Railroad Commissioners concerning the new law, have agreed to reduce rates on merchandise about 20 per cent.

The North Carolina Railroad Commissioners have issued a rule requiring that when a part of a consignment of freight is short the carrier shall not demand charges of the consigner except for the portion delivered.

A Cleveland paper says that with each World's Fair excursion ticket sold the Lake Shore & Michigan Southern issues a blank for the passenger to fill out while in Chicago, stating on what date and train he wishes to return.

According to the Atlanta *Constitution* the Southern Railway & Steamship Association will hereafter restrict the use of special party tickets to theatrical or other companies giving public performances. These tickets have hitherto been sold at two cents a mile for a party of ten or more.

It is reported that westbound shipments of freight from New York to Buffalo and Pittsburgh and beyond amounted to 32,651 tons for the week ending Aug. 31, being a slight increase over the same week last year. Up to this time the movement had been about 25 per cent. below last year, since July 1.

The vesselmen carrying coal from Philadelphia to New England points have succeeded in raising the rate from 50 and 55 cents a ton to 75 cents, to points east of Cape Cod. The rate from Baltimore will be 85 cents. They combined to tie up their vessels, or to use them for

such other traffic as they could find, until consignees would agree to pay remunerative rates.

The trunk lines have decided to continue the day-car excursions from New York to Chicago until Oct. 23, but after Sept. 16 there will probably be only six trains a week instead of eight. These trains, which have been running six weeks, have thus far carried about 80,000 passengers into Chicago. The number of Chicago passengers by all trains from New York during August was five times as great as in August last year, this increase over 1892 being the same as that in July. The passenger traffic to Chicago at regular rates is now heavy. Last Saturday the space in the Exposition Flyer was all sold 24 hours in advance. The sleeping car companies are now having more orders than they can fill.

The United States Treasury Department has negotiated an agreement with the Canadian government by which inspectors of immigration, on behalf of this country, will be stationed at Canadian ports where vessels from Europe deliver passengers. The Canadian government has not yet formally accepted the agreement and it is said that in case it is not concluded inspectors will be placed at all railroad stations where through trains cross from Canada to the United States. During the month of May, 1891, 5,651 immigrants arrived in Canada. Of these 2,154 came directly to the United States. In May, 1892 the number was 7,338, of whom 3,250 came to this country. In May of this year 13,654 immigrants landed and 8,179 of them came to the United States. In June 9,035 arrived, and 5,300 came here.

##### Chicago Traffic Matters.

CHICAGO, Sept. 13, 1893.

The lake and rail situation was cleared, at least temporarily, on Sept. 9 by the lake lines announcing an advance in fifth and sixth class rates from Chicago to New York to 25 and 20 cents per 100 lbs., respectively. In conformity, the Western lines have advanced the flour rate from Minneapolis to New York to basis of 30 cents per 100 lbs. Just what means were taken to bring about the advance is not known, but the impression here is that the Trunk Lines found the pressure being brought by their Western all-rail connections too strong to be ignored and demanded of the lake lines that they advance the rates. While the lake lines nominally have the making of the rates, it is well understood that no rates are reduced without the consent, at least tacitly, of the Trunk Lines. Prior to the announcement of the advance, Chairman Midgley, of the Western Freight Association, issued another letter to his lines in which he called attention to the history of legislation on the subject the present season by the Eastern lines, contending that it was within the province of the Chairman of the Central Traffic Association, or the chairman of the joint committee, to make such rates as were necessary at any time to preserve the agreed differential, and that the Eastern lines could participate or not as they chose. He also pointed out that what the Western lines complained the most about was the fact that the Eastern lines objected to prorating on the 33-cent Minneapolis-New York flour rate earlier in the season, on the ground that it would embarrass them in their treatment of lake lines, while the latter have ever since the opening of navigation made rates on export flour from Western points at pleasure.

The Western Passenger Association has given the Texas lines notice that unless they speedily fulfill their promises to stop selling round-trip tickets to Chicago that can be scalped at St. Louis, Kansas City and other river points, they will be denied relations with their Northern connections.

The Union Pacific has given notice to its connections that passenger rates to points south of Ashland, Or., via Portland, which are less than the rates to the same points via Ogden and Sacramento, must be canceled.

The Illinois Central's World's Fair and suburban traffic for May, June, July and August was as follows: May, 2,047,895; June, 2,927,213; July, 2,690,680; August, 2,886,200; total, 10,556,200 passengers. For August the daily average was 96,000 passengers.

The Chicago & Northwestern has established a new sleeping-car service between Chicago and Escanaba, Mich., leaving Chicago at 8 p. m., and arriving at Escanaba at 7:30 a. m. The sleeper between Chicago and Green Lake has been discontinued.

The Michigan Central on Sept. 8 brought in 2,900 excursionists.

Some of the Northwestern lines have been for some time exercised over the making of blanket excursion rates to the World's Fair by their competitors, claiming that the rates were so low that it was absurd to suppose that they did not involve a reduction in the agreed rates of fare. The offending lines have strenuously claimed that the rates were being maintained, and that the low rates were on account of low rates for lodging, etc. At a meeting last week, however, it was voted to discontinue newspaper and hotel excursions at blanket rates.

The commissioners appointed by the Eastern lines last spring to put in effect a division of the eastbound passenger traffic have decided, after full conference with the lines, that in view of the unusual conditions governing travel this summer that it is inexpedient to make the proposed agreement effective until after the World's Fair.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Sept. 9 amounted to 52,296 tons, against 50,149 tons during the preceding week, an increase of 2,087 tons, and against 55,540 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	Wk to Sept. 9		Wk to Sept. 2.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	7,030	13.4	7,007	14.0
Wabash.....	3,674	7.1	4,065	8.1
Lake Shore & Michigan South.....	7,885	15.1	6,819	13.6
Pitts., Ft. Wayne & Chicago.....	5,028	9.6	5,516	11.0
Pitts., Chi., Chicago & St. Louis.....	7,162	13.7	6,335	13.4
Baltimore & Ohio.....	2,966	5.7	2,652	5.3
Chicago & Grand Trunk.....	3,682	7.1	4,000	8.0
New York, Chic. & St. Louis.....	4,507	8.6	5,128	10.2
Chicago & Erie.....	7,935	14.0	6,001	12.0
C., C., C. & St. Louis.....	2,997	5.7	2,223	4.4
Totals .....	52,296	100.0	50,149	100.0

Of the above shipments 1,131 tons were flour, 20,753 tons grain and millstuff, 10,669 tons cured meats, 10,855 tons dressed beef, 1,540 tons butter, 1,293 tons hides and 3,488 tons lumber. The three Vanderbilt lines carried 37.1 per cent., the two Pennsylvania lines 23.3 per cent. The Lake lines carried 85,248 tons, against 80,746 tons during the preceding week, an increase of 4,502 tons.

*Other Chicago traffic news will be found on page 687.*